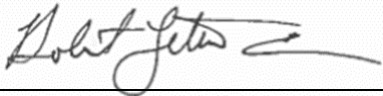


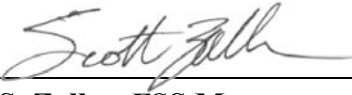




**LA CROSSE BOILING WATER REACTOR  
FINAL STATUS SURVEY RELEASE RECORD**

**WASTE GAS TANK VAULT BASEMENT  
SURVEY UNIT B1-010-004**



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**LIST OF ACRONYMS AND ABBREVIATIONS**

ALARA	As Low As Reasonably Achievable
BFM	Basement Fill Model
DQO	Data Quality Objective
DCGL	Derived Concentration Guideline Level
DCGL <sub>B</sub>	Basement Derived Concentration Guideline Level
EMC	Elevated Measurement Comparison
FOV	Field-of-View
FSS	Final Status Survey
IC	Insignificant Contributors
ISOCS	In-Situ Object Counting System
LACBWR	La Crosse Boiling Water Reactor
LBGR	Lower Bound of the Gray Region
LTP	License Termination Plan
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MDC	Minimum Detectable Concentration
OpDCGL <sub>B</sub>	Basement Operational Derived Concentration Guideline Level
QAPP	Quality Assurance Project Plan
QC	Quality Control
ROC	Radionuclides of Concern
SOF	Sum-of-Fraction
UBGR	Upper Bound of the Gray Region
WGTV	Waste Gas Tank Vault
WTB	Waste Treatment Building

## 1. EXECUTIVE SUMMARY

This Final Status Survey (FSS) Release Record for survey unit B1-010-004, Waste Gas Tank Vault (WGTV) Basement, has been generated in accordance with LaCrosseSolutions procedure LC-FS-PR-009, *Final Status Survey Data Reporting* (Reference 1) and satisfies the requirements of Section 5.11 of the *La Crosse Boiling Water Reactor License Termination Plan* (LACBWR LTP) (Reference 2).

An FSS sample plan for this survey unit was developed in accordance with LaCrosseSolutions procedure LC-FS-PR-002, *Final Status Survey Package Development* (Reference 3), the LACBWR LTP, and with guidance from NUREG-1575, Revision 1, *Multi-Agency Radiation Survey and Site Investigation Manual* (MARSSIM) (Reference 4).

This survey unit has a MARSSIM classification of 1. A survey plan was designed based upon use of the Sign Test as the nonparametric statistical test for compliance. Both the Type I ( $\alpha$ ) and Type II ( $\beta$ ) decision error rates were set at 0.05. As a systematic measurement population, twenty-two (22) measurements using the Canberra In-Situ Object Counting System (ISOCs) were acquired from the survey unit. One (1) additional judgmental ISOCs measurement was collected to capture the surface area of the sump within the survey unit. In addition, surface scanning was performed on 100% of the floor in the survey unit.

The analytical results for all systematic measurements taken in survey unit B1-010-004 indicate that the maximum Sum-of-Fraction (SOF), considering the concentration of all applicable Radionuclides of Concern (ROC), either by direct measurement or by inference, is equal to 0.2410 when applying the respective Operational Derived Concentration Guideline Levels (OpDCGL<sub>B</sub>). Therefore, the null hypothesis is rejected and survey unit B1-010-004 is acceptable for unrestricted release.

The mean SOF for systematic measurements when applying the respective Base Case DCGLs (DCGL<sub>B</sub>) is 0.0075. The SOF for the judgmental measurement, when compared to the DCGL<sub>B</sub>, is 0.9903. The total SOF, when factoring in the area-weighted SOF of the judgmental measurement is 0.0233, which equates to a dose of 0.5813 mrem/yr.

## 2. SURVEY UNIT DESCRIPTION

B1-010-004 is an impacted Class 1 basement survey unit. This survey unit housed Waste Gas Decay Tanks which were used in the operation or support of the nuclear steam system. All internal systems were removed during demolition. At end-state, the survey unit consisted of the concrete floor, concrete walls up to 3 feet below grade (636 foot elevation), a concrete support column in the center of the floor that extends up to 3 feet below grade,

and a 3-foot by 3-foot by 3-foot deep sump in the north-west corner. The total surface area of the survey unit is 311 m<sup>2</sup>.

### 3. CLASSIFICATION BASIS

Based on the *Historical Site Assessment* (Reference 5), the WGTV basement was identified as a Class 1 area.

The initial site characterization surveys performed by EnergySolutions were conducted between October 9, 2014, and August 6, 2015. Because of limited accessibility, the WGTV interior structural surfaces characterization was deferred.

A Contamination Verification Survey of the WGTV (17-0854) was conducted on May 19, 2017. The findings of the survey revealed dose rates of less than 2 mrem/hr. Loose surface contamination levels for alpha were all found to be less than MDC. One (1) elevated beta reading of 1,315 dpm/100cm<sup>2</sup> was discovered and “locked down” with a paint fixative. The follow-up loose contamination survey revealed only 51 dpm/100cm<sup>2</sup> for beta, which is below the 1,000 dpm/100cm<sup>2</sup> limit.

Continuing characterization surveys of the interior surfaces of the WGTV were conducted between August 29, 2017 and September 1, 2017. The survey design called for the acquisition of eight (8) subsurface soil samples and eight (8) concrete core samples, in addition to a 100% scan of the floor and the collection of thirty (30) loose surface contamination samples. A Ludlum Model 44-10 detector attached to a Ludlum Model 2350-1 instrument was used for the scan survey. Concrete core locations were determined at locations of highest scan indications.

Four (4) subsurface soil samples were collected on the building perimeter soil and four (4) subsurface soil samples were collected from beneath concrete core samples. The subsurface soil samples were analyzed for the full suite of ROC off-site by GEL Laboratories. Out of the eight (8) subsurface soil samples, Cs-137 was detected at concentrations above MDC in three (3) of the samples, at a maximum concentration of 0.108 pCi/g. No other ROC were identified in the subsurface soil samples.

Five (5) concrete core samples were collected from the floor, two (2) from the sump, and one (1) was collected on the lower wall in the survey unit. The cores were 3” in diameter and 6” deep. Table 3-1 below summarizes the results from the concrete core analyses using the on-site gamma spectroscopy system. Only the top half-inch puck from each core was analyzed.

**Table 3-1 – WGTB Continuing Characterization Concrete Core Analysis Summary - On-site**

Sample ID	Puck Surface	Cs-137 Activity (pCi/g)
B1-010-04A-CJFC-009-CV 0-0.5"	Top	<b>5.95E+00</b>
B1-010-04A-CJFC-009-CV 0-0.5"	Bottom	<b>2.70E+00</b>
B1-010-04A-CJFC-010-CV 0-0.5"	Top	<b>1.05E+01</b>
B1-010-04A-CJFC-010-CV 0-0.5"	Bottom	<b>6.11E+00</b>
B1-010-04A-CJFC-011-CV 0-0.5"	Top	<b>4.63E+00</b>
B1-010-04A-CJFC-011-CV 0-0.5"	Bottom	<b>1.59E+00</b>
B1-010-04A-CJFC-012-CV 0-0.5"	Top	<b>3.16E+00</b>
B1-010-04A-CJFC-012-CV 0-0.5"	Bottom	<b>8.82E-01</b>
B1-010-04A-CJFC-013-CV 0-0.5"	Top	<b>1.48E+02</b>
B1-010-04A-CJFC-013-CV 0-0.5"	Bottom	<b>5.07E+01</b>
B1-010-04A-CJFC-014-CV 0-0.5"	Top	<b>7.42E+01</b>
B1-010-04A-CJFC-014-CV 0-0.5"	Bottom	<b>2.27E+01</b>
B1-010-04A-CJWC-015-CV 0-0.5"	Top	4.74E-02
B1-010-04A-CJWC-015-CV 0-0.5"	Bottom	8.89E-02
B1-010-04A-CJFC-016-CV 0-0.5"	Top	<b>5.48E+00</b>
B1-010-04A-CJFC-016-CV 0-0.5"	Bottom	<b>2.05E+00</b>

Note: Bold values indicate activity above MDC

Cs-137 was detected in concentrations above MDC in seven (7) of the eight (8) pucks analyzed. No other ROC were identified in the continuing characterization concrete cores.

All of the top half-inch pucks from each concrete core sample were sent off-site to Gel Laboratories for gamma spectroscopy and HTD analysis. Table 3-2 summarizes the results of the off-site analyses.

Table 3-2 - WGTV Continuing Characterization Concrete Core Analysis Summary - Off-site

Radionuclide	B1-010-04A-CJFC-009-CV (pCi/g)	B1-010-04A-CJFC-010-CV (pCi/g)	B1-010-04A-CJFC-011-CV (pCi/g)	B1-010-04A-CJFC-012-CV (pCi/g)	B1-010-04A-CJFC-013-CV (pCi/g)	B1-010-04A-CJFC-014-CV (pCi/g)	B1-010-04A-CJWC-015-CV (pCi/g)	B1-010-04A-CJFC-016-CV (pCi/g)
Am-241	-1.50E-02	2.69E-02	4.40E-02	3.12E-02	<b>5.05E-01</b>	<b>6.83E-01</b>	5.13E-03	<b>5.20E-02</b>
Am-243	-4.15E-03	3.87E-03	1.57E-02	4.43E-02	-1.06E-02	1.27E-02	4.36E-03	5.06E-04
Cm-243/244	3.35E-03	7.57E-03	1.93E-03	4.92E-04	-2.57E-03	1.30E-02	5.10E-03	-3.40E-03
Np-237	1.02E-01	-1.19E-02	3.15E-02	-4.88E-02	-6.24E-02	-9.56E-03	1.83E-02	8.66E-03
Pu-238	-3.53E-03	1.64E-02	6.04E-03	-8.73E-03	<b>1.73E-01</b>	<b>2.33E-01</b>	2.16E-03	1.79E-02
Pu-239/240	-3.52E-03	-1.07E-02	3.62E-03	-1.02E-02	<b>8.46E-02</b>	<b>2.70E-01</b>	<b>2.07E-02</b>	-1.58E-03
Pu-241	-2.05E-01	9.58E-01	2.11E-01	-1.92E+00	4.40E+00	<b>5.59E+00</b>	4.22E-01	6.92E-01
Ni-59	-2.20E-01	-2.48E-01	1.01E+00	-1.35E-01	-1.81E+00	2.53E-01	-2.99E-01	5.11E-01
Cs-137	<b>5.32E+00</b>	<b>9.57E+00</b>	<b>6.02E+00</b>	<b>4.66E+00</b>	<b>2.54E+02</b>	<b>1.37E+02</b>	-7.21E-03	<b>6.64E+00</b>
Co-60	2.50E-02	6.69E-02	0.00E+00	1.13E-01	<b>2.66E-01</b>	<b>2.46E-01</b>	-4.03E-02	6.93E-02
Eu-152	8.62E-02	-3.75E-02	5.35E-02	8.38E-03	-7.97E-01	3.33E-01	1.63E-02	1.08E-01
Eu-154	-1.46E-01	-9.50E-02	-5.66E-02	-2.99E-02	-3.84E-02	-1.01E-01	-6.24E-02	1.12E-01
Eu-155	6.72E-02	1.65E-01	7.12E-02	8.03E-02	8.70E-02	7.52E-02	1.70E-01	-8.62E-02
Nb-94	-2.81E-02	3.72E-02	4.28E-02	-8.53E-04	3.00E-03	-3.79E-03	3.67E-02	1.01E-02
Sr-90	1.02E-01	2.28E-01	1.06E-01	-2.88E-02	1.28E-01	1.09E-01	-2.17E-01	-4.27E-02
H-3	3.57E+00	4.83E+00	4.29E+00	2.01E+00	1.82E+00	5.15E+00	3.73E+00	3.91E+00
C-14	-7.04E-01	-2.34E-01	-6.72E-01	9.23E-01	-1.84E+00	-1.42E-02	1.10E+00	5.25E-01
Tc-99	6.59E-02	-5.60E-01	-4.18E-01	-6.56E-01	-4.98E-01	<b>2.86E+00</b>	-5.31E-01	-5.50E-02
Fe-55	-2.95E+00	-3.71E+00	2.68E+00	-5.75E+00	-5.77E+00	-4.84E+00	1.97E+00	-4.20E+00
Ni-63	9.15E-01	<b>6.41E+00</b>	2.08E+00	2.70E+00	<b>1.00E+01</b>	<b>1.07E+01</b>	1.43E+00	1.33E+00

Note: Bold values indicate activity above MDC

Cs-137 was positively identified in seven (7) of the eight (8) core samples. Co-60 was positively identified in two (2) of the eight (8) core samples. Other significant radionuclides identified at concentrations greater than their respective MDCs include Am-141, Pu-238, Pu-239/240, Pu-241, Tc-99, and Ni-63.

Section 5.1 of the LTP states that the actual Insignificant Contributor (IC) dose will be calculated for each individual sample result using the DCGLs from TSD RS-TD-313196-004, *LACBWR Soil DCGL*, *Basement Concrete DCGL*, and *Buried Pipe DCGL*, Table 35 (Reference 6) for basement structures. If the IC dose calculated is less than the IC dose assigned for DCGL adjustment, then no further action will be taken. If the actual IC dose calculated from the sample result is greater than the IC dose assigned for DCGL adjustment, then a minimum of five (5) additional investigation samples will be taken around the original sample location. Each investigation sample will be analyzed by the on-site gamma spectroscopy system and sent for HTD analysis (full suite of radionuclides from LTP Table 5-1). As with the original sample, the actual IC dose will be calculated for each investigation sample. In this case, the actual calculated maximum IC dose from an individual sample observed in the survey unit will be used to readjust the DCGLs in that survey unit. If the maximum IC dose exceeds 10%, then the additional radionuclides that were the cause of the IC dose exceeding 10% will be added as additional ROC for that survey unit. The survey unit-specific DCGLs used for compliance, the ROC for that survey unit, and the survey data serving as the basis for the IC dose adjustment will be documented in the release record for the survey unit.

An assessment of the results of continuing characterization confirmed that the IC dose is unchanged (dose fraction less than 10%).

Based upon review of the historical information, the results of the characterization survey data, and completion of a final Survey Unit Classification Worksheet, the correct final classification of survey unit B1-010-004 was determined to be Class 1.

#### **4. DATA QUALITY OBJECTIVES**

FSS planning and design relies on a properly executed Data Quality Objective (DQO) process to ensure, through compliance with explicitly defined inputs and boundaries, that the primary objective of the survey is satisfied. The DQO process is described in the LACBWR LTP in accordance with MARSSIM. The appropriate design for a given survey was developed using the DQO process as outlined in Appendix D of MARSSIM.

The DQO process incorporated hypothesis testing and probabilistic sampling distributions to control decision errors during data analysis. Hypothesis testing is a process based on the scientific method that compares a baseline condition to an alternate condition. The baseline condition is technically known as the null hypothesis. Hypothesis testing rests on the



premise that the null hypothesis is true and that sufficient evidence must be provided for rejection. In designing the survey plan, the underlying assumption, or null hypothesis was that residual activity in the survey unit exceeded the release criteria. Rejection of the null hypothesis would indicate that residual activity within the survey unit does not exceed the release criteria. Therefore, the survey unit would satisfy the primary objective of the FSS sample plan.

The primary objective of the FSS sample plan is to demonstrate that the level of residual radioactivity in survey unit B1-010-004 did not exceed the release criteria specified in the LTP and that the potential dose from residual radioactivity is As Low As Reasonably Achievable (ALARA).

LaCrosseSolutions TSD RS-TD-313196-001, *Radionuclides of Concern during LACBWR Decommissioning* (Reference 7) established the basis for an initial suite of potential ROC for decommissioning. LTP Chapter 2 provides detailed characterization data that describes current contamination levels in the basements and soils from the characterization campaign conducted from September 2014 through August 2015. The initial survey data for basements was based on core samples obtained from the walls and floors of the Reactor Building, Waste Treatment Building (WTB), and the balance of the basement structures (primarily the Piping Tunnels) at biased locations with elevated contact dose rates, contamination levels, and/or evidence of leaks/spills. During subsequent characterizations, additional cores were obtained from the Reactor Building and the WGTV. TSD RS-TD-313196-001 evaluates the results of the concrete core analysis data from the Reactor Building, WTB, Piping Tunnels and WGTV and refines the initial suite of potential ROC by evaluating the dose significance of each radionuclide.

Insignificant dose contributors were determined consistent with the guidance contained in Section 3.3 of NUREG-1757, Volume 2, Revision 1, *Consolidated Decommissioning Guidance – Characterization, Survey, and Determination of Radiological Criteria, Final Report* (Reference 8). In all soil and concrete scenarios, Cs-137, Co-60, Sr-90, Eu-152 and Eu-154 contribute nearly 100% of the total dose. The remaining radionuclides were designated as insignificant dose contributors and are eliminated from further detailed evaluation. Therefore, the final ROCs for LACBWR soil, basement concrete and buried piping are Cs-137, Co-60, Sr-90, Eu-152 and Eu-154.

LTP Chapter 6, Section 6.14.1 discusses the process used to derive the ROC for the decommissioning of LACBWR, including the elimination of insignificant dose contributors (IC) from the initial suite. Table 4-1 presents the ROC for the decommissioning of basements at LACBWR and the normalized mixture fractions for the WGTV based on the radionuclide mixture.

**Table 4-1 - WGTB Dose Significant Radionuclides and Mixture**

Radionuclide	Fraction of Total Activity (normalized) <sup>(1)</sup>
Co-60	0.010
Sr-90	0.019
Cs-137	0.957
Eu-152	0.010
Eu-154	0.003

(1) Based on maximum percent of total activity from Table 22 of RS-TD-313196-001, normalized to one for the dose significant radionuclides.

LTP, Section 5.2 states that each radionuclide-specific Base Case DCGL is equivalent to the level of residual radioactivity (above background levels) that could, when considered independently, result in a Total Effective Dose Equivalent of 25 mrem/yr to an Average Member of the Critical Group. To ensure that the summation of dose from each source term is 25 mrem/yr or less after all FSS is completed, the Base Case DCGLs are reduced based on an expected, or *a priori*, fraction of the 25 mrem/yr dose limit from each source term. The reduced DCGLs, or “Operational” DCGLs can be related to the Base Case DCGLs as an expected fraction of dose based on an *a priori* assessment of what the expected dose should be based on the results of site characterization, process knowledge and the extent of planned remediation. The Operational DCGL is then used as the DCGL for the FSS design of the survey unit (calculation of surrogate DCGLs, investigations levels, etc.). Details of the Operational DCGLs derived for each dose component and the basis for the applied *a priori* dose fractions are provided in LC-FS-TSD-002, *Operational Derived Concentration Guideline Levels for Final Status Survey* (Reference 9).

The dose contribution from each ROC is accounted for using the SOF to ensure that the total dose from all ROC does not exceed the dose criterion. A Base Case DCGL that is established for the average residual radioactivity in a survey unit is equivalent to a DCGL<sub>W</sub>.

At LACBWR, compliance is demonstrated through the summation of dose from five (5) distinct source terms for the end-state (basements, soils, buried pipe, above ground structures, and groundwater). When applied to backfilled basements below the 636 foot elevation, the DCGLs are expressed in units of activity per unit of area (pCi/m<sup>2</sup>).

The Basement Fill Model (BFM) applies to the steel-reinforced concrete walls and floors of the backfilled Reactor Building and WGTB below the 636 foot elevation. BFM DCGLs (DCGL<sub>B</sub>) apply to basement concrete and are calculated in LTP Chapter 6, Section 6.13. The insignificant dose contributor percentages for the most limiting basement scenario was

used to adjust the  $DCGL_B$  to account for the dose from the eliminated insignificant contributor radionuclides. The  $DCGL_B$  values for the WGTB from LTP Chapter 5, Section 5.2.1 are reproduced below in Table 4-2.

**Table 4-2 - WGTB Base Case  $DCGL_B$ s**

<b>Radionuclide</b>	<b>WGTB <math>DCGL_B</math> (pCi/m<sup>2</sup>)</b>
Co-60	4.10E+06
Sr-90	6.40E+06
Cs-137	1.76E+07
Eu-152	9.69E+06
Eu-154	8.97E+06

The Operational  $DCGL_B$ s are then used as the  $DCGL$  for the FSS design of the survey unit (calculation of surrogate  $DCGL_B$ s, investigation levels, etc.). The BFM Op $DCGL_B$  for the unrestricted release of the WGTB survey unit from LTP Chapter 5, Section 5.2.2 are provided in Table 4-3.

**Table 4-3 - WGTB Operational  $DCGL_B$ s**

<b>Radionuclide</b>	<b>WGTB Op<math>DCGL_B</math> (pCi/m<sup>2</sup>)</b>
Co-60	2.87E+05
Sr-90	4.48E+05
Cs-137	1.23E+06
Eu-152	6.78E+05
Eu-154	6.28E+05

Instrument DQOs included a verification of the ability of the survey instrument to detect the radiation(s) of interest relative to the Operational  $DCGL$ . The Canberra ISOCS was selected as the primary instrument used to perform FSS of basement surfaces. Response checks were required prior to issuance and after use. Control and accountability of ISOCS units was required to assure data quality.

As part of the DQOs applied to laboratory processes, analysis results were reported as actual calculated results. The actual recorded value was used as the recorded FSS result for measurement and/or sample values that are less than MDC. Negative values were recorded as “zero.” Results were not reported as “less than MDC” (< MDC). Sample report

summaries included unique sample identification, analytical method, radionuclide, result, uncertainty, laboratory data qualifiers, units, and the observed MDC.

In accordance with the LTP, for laboratory analysis, MDCs less than 10% of the Operational DCGL were preferable while MDCs up to 50% of the Operational DCGL were acceptable. The minimum acceptable MDC for measurements obtained using field instruments was 50% of the applicable Operational DCGL.

## 5. SURVEY DESIGN

The level of effort associated with planning a survey is based on the complexity of the survey unit and nature of the hazards. Guidance for preparing FSS plans is provided in procedure LC-FS-PR-002, *Final Status Survey Package Development*.

The DQO process determined that Co-60, Sr-90, Cs-137, Eu-152, and Eu-154 would be the ROC in survey unit B1-010-004. During FSS, concentrations for the HTD ROC Sr-90 are inferred using a surrogate approach. Cs-137 is the principle surrogate radionuclide for Sr-90. Both Sr-90 and Cs-137 was positively detected in all thirty (30) concrete core samples assessed in the Reactor Building, Piping Tunnels, and WTB. For the WGTB, Sr-90 was not detected in any of the eight (8) core samples assessed during continuing characterization. The 95% Upper Confidence Limit (UCL) of the Cs-137 fractions was chosen to represent the overall nuclide mix for soils/buried pipe, the Reactor Building, and the WGTB. The surrogate ratio for the WGTB is given in Table 5-1.

**Table 5-1 – WGTB Surrogate Ratio**

Radionuclides	Ratio
Sr-90/Cs-137	0.0675

The equation for calculating a surrogate DCGL is as follows:

**Equation 1**

$$Surrogate_{DCGL} = \frac{1}{\left[ \left( \frac{1}{DCGL_{Sur}} \right) + \left( \frac{R_2}{DCGL_2} \right) + \left( \frac{R_3}{DCGL_3} \right) + \dots \left( \frac{R_n}{DCGL_n} \right) \right]}$$

Where:  $DCGL_{Sur}$  = Surrogate radionuclide DCGL

$DCGL_{2,3,\dots,n}$  = DCGL for radionuclides to be represented by the surrogate

$R_n$  = Ratio of concentration (or nuclide mixture fraction) of

radionuclide “n” to surrogate radionuclide

Using the Operational DCGLs presented in Table 4-3 and the ratio from Table 5-1, the following surrogate calculation was performed:

**Equation 2**

$$Surrogate_{DCGL(Cs-137)} = \frac{1}{\left[ \left( \frac{1}{1.23E+06_{(Cs-137)}} \right) + \left( \frac{0.0675}{4.48E+05_{(Sr-90)}} \right) \right]} = 1.04E+06 \text{ pCi/m}^2$$

The surrogate Operational DCGL that was used for Cs-137 in this survey unit for direct comparison of measurement results to demonstrate compliance was 1.04E+06 pCi/m<sup>2</sup>.

The action levels for survey unit B1-010-004 are based on the Operational DCGL and are presented in Table 5-2.

**Table 5-2 – Action Levels for Survey Unit B1-010-004**

ROC	OpDCGL <sub>B</sub> (pCi/m <sup>2</sup> )
Co-60	2.87E+05
Cs-137	1.04E+06 <sup>(1)</sup>
Eu-152	6.78E+05
Eu-154	6.28E+05

(1) Based on the surrogate adjusted DCGL of Cs-137 while inferring Sr-90.

The Sign Test was selected as the non-parametric statistical test. The use of the Sign Test did not require the selection or use of a background reference area, which simplified survey design and implementation.

The Elevated Measurement Comparison (EMC) does not apply to this survey unit. At LACBWR, EMC only applies to Class 1 open land areas.

Sample size determination for FSS basement structures is addressed in LTP Chapter 5, Section 5.5.2.2. To ensure that the number of ISOCS measurements, based on the necessary areal coverage in a basement surface FSS unit, was sufficient to satisfy a statistically based sample design, a calculation was performed to determine sample size. If the sample size based on the statistical design required more ISOCS measurements than the number of ISOCS measurements required by the areal coverage, then the number of ISOCS measurements was adjusted to meet the larger sample size.

The number of measurements for FSS was determined in accordance with procedure LC-FS-PR-002. The relative shift ( $\Delta/\sigma$ ) for the survey unit data set is defined as shift ( $\Delta$ ), which is the Upper Boundary of the Gray Region (UBGR), or the DCGL (SOF of 1), minus the Lower Bound of the Gray Region (LBGR) (SOF of 0.5), divided by sigma ( $\sigma$ ), which is the standard deviation of the data set used for survey design. The optimal value for  $\Delta/\sigma$  should range between one (1) and three (3). The largest value the  $\Delta/\sigma$  can have is three (3). If the  $\Delta/\sigma$  exceeds three (3), then the value of three (3) will be used for  $\Delta/\sigma$ . In the absence of prior survey data, the survey design used the MARSSIM recommended standard deviation value of 0.3. The  $\Delta/\sigma$  for survey unit B1-010-004 was calculated as follows:

**Equation 3**

$$\Delta/\sigma = 0.5/0.3 = 1.67$$

Both the Type I error, or  $\alpha$  value, and the Type II error, or  $\beta$  value, were set at 0.05. The sample size for use with the Sign Test from Table 5.5 of MARSSIM that equates to the Type I and Type II error of 0.05 and a relative shift of 1.67 is an N value of seventeen (17).

The required areal scan coverage for a Class 1 basement survey unit is 100%. The LTP requires that sufficient measurements be taken in a Class 1 FSS unit to ensure that 100% of the surface area was surveyed. The number of ISOCS measurements required in each FSS unit can be calculated as the quotient of the ISOCS Field-of-View (FOV) divided into the surface area required for areal coverage. Table 5-3 presents the minimum number of ISOCS measurements that were required for survey unit B1-010-004 based on a measurement FOV of 28 m<sup>2</sup>.

**Table 5-3 – Number of ISOCS Measurements based on Areal Coverage**

Survey Unit	Classification	Area (m <sup>2</sup> )	Minimum Areal Coverage (% of Area)	# of ISOCS Measurements (based on 28 m <sup>2</sup> FOV)
WGTB Basement	Class 1	311	100%	11

The ISOCS FOV was overlapped to ensure that there were no un-surveyed corners and gaps. Additionally, as discussed above with relative shift, MARSSIM requires a minimum of fourteen (14) measurements. The adjusted minimum number of ISOCS measurements in the WGTB basement to account for overlap and the MARSSIM requirements for minimum sample size is provided in Table 5-4.



**Table 5-4 – Adjusted Minimum Number of ISOCS Measurements**

Survey Unit	Classification	Required Areal Coverage (m <sup>2</sup> )	Adjusted # of ISOCS Measurements (based on 16 m <sup>2</sup> FOV)	Adjusted Areal Coverage (m <sup>2</sup> )	Adjusted Areal Coverage (% of Area)
WGTB Basement	Class 1	311	22	311	100%

The areal scan coverage requirements for FSS of structures as specified in the LTP is commensurate with the probability that a small area of elevated activity could exist within an FSS unit in a concentration exceeding the Base Case DCGL and the likelihood that such an area would not be detected by the FSS ISOCS measurements. It is highly unlikely that the ISOCS, with a nominal FOV of approximately 28 m<sup>2</sup> would not detect and account for elevated areas. The primary basis used to determine reasonable areal coverage for the ISOCS measurements is the potential for the Operational DCGL to be exceeded. The criterion for selecting reasonable and risk-informed areal coverage is based on a graded approach similar to the guidance for scan surveys during FSS provided in MARSSIM, where the coverage is based on the expected fraction of the DCGL (in this case the Operational DCGL). All ISOCS measurement locations collected for survey unit B1-010-004 are provided on the map in Attachment 1 of this document.

The coordinates for all of the ISOCS measurement locations were conspicuously marked to designate where to position the survey rig to the center-point of the instrument FOV. The ISOCS detector was then positioned either vertically or horizontally and adjacent to the surface at the center-point of each designated floor or wall measurement location. Each survey measurement location would then be reproducible utilizing permanent markings on the survey unit floor and walls and annotated on the survey map and Attachment 14 of the sample plan, “FSS Samples/Measurements Identification and Coordinates.”

The implementation of quality control measures as referenced by LTP Chapter 5, section 5.9 and LaCrosseSolutions LC-QA-PN-001, *Final Status Survey Quality Assurance Project Plan* (QAPP) (Reference 10) includes the collection of a replicate measurement at 5% of the measurements taken in a survey unit with the locations selected at random. Two (2) ISOCS measurements were selected randomly for the replicate measurements for this survey unit.

In accordance with Section 5.1 of the LTP, concrete core samples are required to be collected at 10% of the ISOCS measurement locations during FSS for HTD analysis. The eight (8) continuing characterization concrete cores were used to satisfy the requirement in

the LTP, as they were representative of the survey unit's end state condition. See Section 3 of this report for the data concerning the concrete cores.

As a Class 1 survey unit, Table 5-4 specifies that a minimum of 311 m<sup>2</sup>, or 100% of the accessible surface area, in this structural basement survey unit will be subjected to scan coverage. The minimum number of ISOCS measurements required to fully cover the 311 m<sup>2</sup> surface area is twenty-two (22). The surface area covered by a single ISOCS measurement is large, and the FOV of the measurement becomes a substitute for scanning that is typically performed by moving a hand-held detector over the surface in question. Systematic ISOCS measurements were taken of WGTB basement surfaces at a stand-off distance of 3 meters. This resulted in a FOV for each measurement of 28 m<sup>2</sup>.

To achieve 100% areal coverage for the 311 m<sup>2</sup> of floor and wall surfaces that constitute this survey unit, along with the minimum of 5% replicate measurements and judgmental sump measurement, 25 ISOCS measurements were taken (22 systematic, 1 judgmental, 2 replicate).

A majority of the ISOCS measurements were collected using the circular plane geometry although varied geometries were necessary due to the structural anomalies encountered within the survey unit. The sump, located in the north-west corner of the WGTB basement floor, required the use of a "rectangular plane" geometry. ISOCS geometries specifically employed within this survey unit are provided in Attachment 2 of this report. Maps of the surface area scanned by the ISOCS FOV are provided in Attachment 1.

For this Class 1 basement structure survey unit, the "Investigation Levels" for ISOCS measurement results are those levels specified in LTP Chapter 5, Table 5-16, and are reproduced below in Table 5-5.

**Table 5-5 - Investigation Levels**

Classification	Scan Investigation Levels	Direct Investigation Levels
Class 1	>Operational DCGL or >MDC <sub>scan</sub> if MDC <sub>scan</sub> is greater than Operational DCGL	>Operational DCGL

Table 5-6 provides a synopsis of the survey design for survey unit B1-010-004.

**Table 5-6 - Synopsis of Survey Design**

Feature	Design Criteria	Basis
Survey Unit Surface Area	311 m <sup>2</sup>	LTP Ch. 5, Table 5-13 and Table 5-14

Feature	Design Criteria	Basis
Number of Systematic Measurements (N)	17	<ul style="list-style-type: none"> <li>• UBGR = SOF of 1</li> <li>• LBGR = SOF of 0.5</li> <li>• Type I error = 0.05</li> <li>• Type II error = 0.05               <ul style="list-style-type: none"> <li>• <math>\Delta/\sigma = 1.67</math></li> </ul> </li> <li>• MARSSIM Table 5.5</li> </ul>
Adjusted Number of Systematic Measurements	22	<ul style="list-style-type: none"> <li>• Based on 100% scan coverage accounting for overlap</li> </ul>
DCGLs	<ul style="list-style-type: none"> <li>• Co-60: 2.87E+05</li> <li>• Sr-90: 4.48E+05</li> <li>• Cs-137: 1.23E+06</li> <li>• Eu-152: 6.78E+05</li> <li>• Eu-154: 6.28E+05</li> </ul>	Operational DCGLs for WGTB Basement, (LTP Chapter 5, Table 5-4)
Investigation Level	>Operational DCGL	(LTP Chapter 5, Table 5-16)
Scan Areal Coverage	311 m <sup>2</sup> or 100% areal coverage	(LTP Chapter 5, Table 5-15)
Number of Judgmental Measurements	1	1 ISOCS measurement with a rectangular plane at the sump
QC	2 measurements selected randomly for replicate measurement analysis	(LTP Chapter 5, Section 5.9)
HTD	10% of ISOCS Measurements, Minimum of 2	(LTP Chapter 5, Section 5.1)

## 6. SURVEY IMPLEMENTATION

For survey unit B1-010-004, compliance with the unrestricted release criteria was demonstrated through the use of ISOCS for direct measurements.

An FSS Supervisor performed a visual inspection and walk-down of the survey unit on September 6, 2017, prior to performing FSS. The purpose of the walk-down was to assess the physical condition of the survey unit, evaluate access points and travel paths, and identify potentially hazardous conditions.

A walkdown and turnover survey was satisfactorily performed in the WGTV basement in accordance with the Isolation and Control requirements of procedure LC-FS-PR-010, *Isolation and Control for Final Status Survey* (Reference 11). The WGTV basement was deemed acceptable for turnover and FSS commenced on September 7, 2017, under the FSS sample plan, which included DQOs, survey design, detailed FSS instructions, job safety analysis, and related procedures for reference. A “Field Log” was used to document field activities and other information pertaining to the performance of the FSS.

FSS field activities were projected to take eight (8) working days to complete. Daily briefings were conducted to discuss the expectations for job performance and to review safety aspects of the job. The survey required field activities were performed during normal working hours and concluded on September 18, 2017.

Prior to implementation of ISOCS measurements for FSS, 100% of the floor surface was scanned using a Ludlum Model 43-37 detector attached to a Ludlum Model 3250-1 instrument. This survey was performed to ensure that no small areas of elevated activity were present before ISOCS measurements were collected. The Alarm Set Point (ASP) for this survey was set at the  $OpDCGL_B$  for Co-60, converted to counts per minute (cpm), plus the average background from the survey unit. The maximum scan reading captured was 10,276 cpm. No alarms were produced during the performance of this survey.

Prior to implementing the sample plan for the FSS of the WGTV basement structure, the physical condition of the concrete surfaces to be surveyed were assessed to ensure that the geometry was not significantly changed from that assumed in LC-FS-TSD-001, *Use of ISOCS for FSS of End State Sub Structures at LACBWR* (Reference 12). ISOCS measurements were acquired using the circular plane geometry, which assumed a circular plane source with a contaminant depth of 0.5 inches. With the 90-degree collimation shield installed and a source to detector distance of 3 meters, this orientation corresponded to a nominal FOV of 28 m<sup>2</sup>. A guide attached to the detector assembly, in the form of a plumb-bob or wooden stud, was used to establish a consistent source to detector distance and center the detector over the selected measurement location.

The ISOCS measurement locations specified in FSS sample plan for survey unit B1-010-004 were marked based on the grid coordinates provided in the maps. The judgmental measurement for the sump required a different geometry, which was a rectangular plane geometry. See Attachment 2 of this report for the ISOCS Geometry Composer Reports.

A total of twenty-two (22) systematic ISOCS measurements were collected in the survey unit. One (1) judgmental measurement was collected in the sump. Two (2) replicate measurements were also acquired in the WGTV basement at survey locations #3 and #10. The ISOCS detector face was oriented perpendicular to the surface of interest represented

by the grid coordinate. See Picture 1 below for an example of an ISOCS measurement being conducted.

The pre-FSS survey was replicated (except with the use of the Ludlum Model 44-10 detector rather than the Model 43-37) during surveillance, after implementation of the ISOCS measurements was concluded. The survey was performed as a response to a change in the condition of the survey unit after a rain event caused the release of a concrete core hole plug. Water and sediment were also observed to enter the isolated and controlled basement, as it was still exposed post-FSS before being backfilled. The maximum scan reading captured during this surveillance survey was 14,383 cpm. No alarms were produced during the performance of this survey. The water and sediment intrusion from clean areas did not change the as-left radiological conditions of the survey unit and therefore, the FSS was deemed still valid.

To further validate that the as-left radiological conditions had not changed since performance of FSS, one (1) sediment sample and one (1) water sample were also collected from the sump in the survey unit as part of the surveillance after the rain event. The sediment sample contained Cs-137 at a concentration of 1.56E-01 pCi/g, which is well below the DCGL for soil. The water sample contained a concentration of Cs-137 at 3.96E-02 pCi/mL, which is approximately 20% of the EPA Drinking Water Standard.

**Figure 6-1 - ISOCS Measurement**



## **7. SURVEY RESULTS**

The SOF or “unity rule” is applied to the data used for the survey planning, and data evaluation and statistical tests for basement surfaces, since multiple radionuclide-specific measurements will be performed or the concentrations inferred based on known relationships. The SOF or “unity rule” is the mathematical test used to evaluate compliance with radiological criteria for license termination when more than one radionuclide has been determined to be potentially present.

The equation for the unity rule is:



#### Equation 4

$$\frac{C_1}{DCGL_1} + \frac{C_2}{DCGL_2} + \dots + \frac{C_n}{DCGL_n} \leq 1$$

Where:  $C_n$  = concentration of radionuclide  $n$

$DCGL_n$  = DCGL of radionuclide  $n$ .

The application of the unity rule serves to normalize the data to allow for an accurate comparison of the various data measurements to the release criteria. When the unity rule is applied, the  $DCGL_W$  (used for the nonparametric statistical test) becomes 1. The  $DCGL_B$  are directly analogous to the  $DCGL_W$  as defined in MARSSIM. The use and application of the unity rule was performed in accordance with Section 4.3.3 of MARSSIM.

As described in LTP Chapter 5, Section 5.10.3.2, the Sign Test was used to evaluate the measured residual radioactivity against the dose criterion. The SOF for each measurement was used as the sum value for the Sign Test. The Sign Test then demonstrated that the mean activity for each ROC was less than the  $OpDCGL_B$  at a Type 1 decision error of 0.05.

For building surfaces, areas of elevated activity were defined as any area identified by measurement/sample (systematic or judgmental) that exceeded the  $OpDCGL_B$  but was less than the  $DCGL_B$ . Any area that exceeded the  $DCGL_B$  would have required remediation. The SOF (based on the  $OpDCGL_B$ ) for a systematic or judgmental measurement/sample(s) can exceed 1 without remediation as long as the survey unit passes the Sign Test, and the mean SOF (based on the  $OpDCGL_B$ ) for the survey unit does not exceed one. Once the survey data set passes the Sign Test (using Operational DCGLs), then the mean radionuclide activity ( $pCi/m^2$ ) for each ROC from systematic measurements along with any identified elevated areas from systematic and judgmental measurement/samples can be used with the Base Case DCGLs to perform a mean  $SOF_B$  calculation. The dose from residual radioactivity assigned to the FSS unit is the mean  $SOF_B$  multiplied by 25 mrem/yr.

Direct measurement locations were denoted on the concrete walls, floor, and center column of the WGTB basement using the dimensions on the survey map as guidance. See Figure 16-1 on Attachment 1 for a depiction of all measurement locations.

The systematic measurement population consisted of 22 direct measurements that were acquired using the ISOCS. In total, 25 ISOCS measurements were collected, including the systematic, judgmental, and QC measurements. A breakdown of the total ISOCS measurements and SOF for systematic measurements compared to the  $OpDCGL_B$  is provided in Table 7-1. A summary of the results of the 22 ISOCS measurements taken for non-parametric statistical testing when compared to the  $DCGL_B$  is provided in Table 7-2.

The complete ISOCS measurement and gamma spectroscopy reports are presented in Attachment 6.

**Table 7-1 – Summary of Systematic, Judgmental, and QC Measurements**

Total Number of Systematic Measurements	22
Number of Quality Control Measurements	2
Number of Judgmental/Investigational Measurements	1
Total Number of Measurements	25
Mean Systematic Gamma Measurement SOF <sup>(1)</sup>	0.1065
Max Individual Systematic Gamma Measurement SOF <sup>(1)</sup>	0.2410
Number of Systematic Gamma Measurements with SOF $\geq 1$ <sup>(1)</sup>	0

(1) Based on the OpDCGL<sub>B</sub>

**Table 7-2 – Summary of ISOCS Systematic Measurement Statistical Quantities**

ROC	Mean (pCi/m <sup>2</sup> )	Median (pCi/m <sup>2</sup> )	Max. (pCi/m <sup>2</sup> )	Min. (pCi/m <sup>2</sup> )	Std. Dev. (pCi/m <sup>2</sup> )	DCGL <sub>B</sub> (pCi/m <sup>2</sup> )	Avg SOF <sub>B</sub> per ROC	Avg. Dose per ROC
Cs-137	5.77E+04	3.77E+04	1.93E+05	0.00E+00	5.46E+04	1.76E+07	0.0033	0.0820
Co-60	5.49E+03	4.84E+03	1.43E+04	0.00E+00	4.84E+03	4.10E+06	0.0013	0.0335
Eu-152	7.30E+03	0.00E+00	3.37E+04	0.00E+00	1.21E+04	9.69E+06	0.0008	0.0188
Eu-154	1.32E+04	4.37E+03	9.39E+04	0.00E+00	2.13E+04	8.97E+06	0.0015	0.0367
Sr-90	3.90E+03	2.54E+03	1.30E+04	0.00E+00	3.69E+03	6.40E+06	0.0006	0.0152

The total mean SOF for the WGTB basement, based on the mean concentration for each ROC as measured by the systematic measurement population when compared against the DCGL<sub>B</sub>, is 0.0075. This SOF equates to a dose of 0.1863 mrem/yr.

One (1) judgmental ISOCS measurement was collected to assess the sump within the survey unit. The judgmental ISOCS measurement results are presented in Table 7-3.

**Table 7-3 – Summary of ISOCS Judgmental Measurement**

Measurement ID	Cs-137 (pCi/m <sup>2</sup> )	Co-60 (pCi/m <sup>2</sup> )	Eu-152 (pCi/m <sup>2</sup> )	Eu-154 (pCi/m <sup>2</sup> )	Sr-90 (pCi/m <sup>2</sup> )
B1-010-004-FSFC-S19-GM	1.31E+07	3.85E+05	1.02E+05	0.00E+00	8.88E+05

The measurement resulted in a SOF of 14.1652 when compared to the OpDCGL<sub>B</sub> and a SOF of 0.9903 when compared to the DCGL<sub>B</sub>. Because judgmental measurements are outside of the systematic measurement population, an area-weighted SOF for the elevated measurement is calculated and added to the average systematic measurement SOF, which is then used to calculate the overall dose assigned to the basement survey unit. The equation for calculating the area-weighted SOF is provided below.

**Equation 5**

$$SOF_B = \sum_{i=1}^n \frac{Mean\ Conc_{B\ ROC_i}}{Base\ Case\ DCGL_{B\ ROC_i}} + \frac{(Elev\ Conc_{B\ ROC_i} - Mean\ Conc_{B\ ROC_i})}{\left[Base\ Case\ DCGL_{B\ ROC_i} \times \left(\frac{SA_{SU}}{SA_{Elev}}\right)\right]}$$

where:

$SOF_B$	=	SOF for structural surface survey unit within a Basement using Base Case DCGLs
$Mean\ Conc_{B\ ROC_i}$	=	Mean concentration for the systematic measurements taken during the FSS of structural surface in survey unit for each ROC <sub>i</sub>
$Base\ Case\ DCGL_{B\ ROC_i}$	=	Base Case DCGL for structural surfaces (DCGL <sub>B</sub> ) for each ROC <sub>i</sub>
$Elev\ Conc_{B\ ROC_i}$	=	Concentration for ROC <sub>i</sub> in any identified elevated area (systematic or judgmental)
$SA_{Elev}$	=	surface area of the elevated area
$SA_{SU}$	=	adjusted surface area of FSS unit for DCGL calculation

The total SOF for the WGTB Basement was calculated as follows:

**Equation 6**

$$SOF_B = 0.0075 + 0.0158 = 0.0233$$

The total SOF assigned to the WGTB basement survey unit is 0.0233, which equates to a dose of 0.5813 mrem/yr.

The implementation of required QC measures included the collection of two (2) additional ISOCS measurements at locations throughout the Auxiliary Building for “replicate measurement” analysis. The replicate ISOCS measurement results are provided in Table 7-4. The concentration for Sr-90 is inferred based on the ratio given in Table 5-1.

**Table 7-4 – Summary of Replicate ISOCS Measurements for QC**

Measurement ID	Cs-137 (pCi/m <sup>2</sup> )	Co-60 (pCi/m <sup>2</sup> )	Eu-152 (pCi/m <sup>2</sup> )	Eu-154 (pCi/m <sup>2</sup> )	Sr-90 (pCi/m <sup>2</sup> )
B1-010-004-QSFC-03-GM	2.13E+05	8.96E+03	3.21E+04	0.00E+00	1.44E+04
B1-010-004-QSWC-10-GM	2.83E+04	0.00E+00	2.23E+05	0.00E+00	1.91E+03

The complete ISOCS gamma spectroscopy reports are presented in Attachment 6.

## **8. QUALITY CONTROL**

Two (2) replicate measurements were taken during the FSS of this basement structure. Typically, the measurement results are evaluated using USNRC acceptance criteria specified in Inspection Procedure No. 84750, *Radioactive Waste Treatment, and Effluent and Environmental Monitoring* (Reference 13). However, in the case of both of the pairs of standard and comparison measurements, there were no mutually identified radionuclides, and the method for acceptance from the above procedure cannot be utilized. In this case, because both pairs of standard and comparison measurements contained insignificant or no detectable radioactivity and all were well below the OpDCGL<sub>B</sub>, no further action was deemed necessary.

## **9. INVESTIGATIONS AND RESULTS**

No investigations were performed during the performance or analyses of the survey.

## **10. REMEDIATION AND RESULTS**

No radiological remedial action as described by MARSSIM Section 5.4 was performed in this survey unit as a result of the FSS. Chapter 4 of the LTP determined that remediation beyond that required to meet the release criteria is unnecessary and that the remaining residual radioactivity in the structure was ALARA.

## **11. CHANGES FROM THE FINAL STATUS SURVEY PLAN**

There were no addendums to the FSS plan.

## **12. DATA QUALITY ASSESSMENT (DQA)**

The DQO sample design and data were reviewed in accordance with LC-FS-PR-008, *Final Status Survey Data Assessment* (Reference 14) for completeness and consistency. Documentation was complete and legible. Surveys and the collection of measurements were

consistent with the DQOs and were sufficient to ensure that the survey unit was properly designated as Class 1. The survey design had adequate power as indicated by the Retrospective Power Curve (see Attachment 5).

The analytical results indicated that all systematic measurements were less than a SOF of one (1) when compared to the OpDCGL<sub>B</sub>. One (1) judgmental measurement was identified with a SOF greater than one (1) when compared to the OpDCGL<sub>B</sub>, but less than a SOF of one (1) when compared to the DCGL<sub>B</sub>.

The Sign Test (Attachment 3) was performed on the data and compared to the original assumptions of the DQOs. The evaluation of the Sign Test results clearly demonstrates that the survey unit passes the unrestricted release criteria, thus, the null hypothesis is rejected.

The preliminary data review consisted of calculating basic statistical quantities (e.g., mean, median, standard deviation). All data was considered valid including negative values, zeros, values reported below the MDC, and values with uncertainties that exceeded two standard deviations. The mean and median values for each ROC were well below the respective Operational DCGLs. Also, the retrospective power curve shows that a sufficient number of measurements were collected to achieve the desired power. Therefore, the survey unit meets the unrestricted release criteria with adequate power as required by the DQOs.

The data for Cs-137, Co-60, Eu-152, and Eu-154 are presented graphically through frequency plots and quantile plots. All graphical presentations are provided in Attachment 5.

### **13. ANOMALIES**

No anomalies were observed during the performance or analyses of the survey.

### **14. CONCLUSION**

Survey unit B1-010-004 has met the DQOs of the FSS plan. The ALARA criteria as specified in Chapter 4 of the LTP were achieved. The EMC is not applicable to structural surfaces and remediation was not required.

All identified ROC were used for statistical testing to determine the adequacy of the survey unit for FSS. Evaluation of the data shows that none of the systematic ROC concentration values exceeds the OpDCGL<sub>B</sub>. Additionally, the one (1) elevated judgmental location was evaluated and the dose was included in the total dose for the survey unit.

The total SOF assigned to the WGTV basement survey unit is 0.0233, which equates to a dose of 0.5813 mrem/yr.

The measurement data passed the Sign Test. The null hypothesis was rejected. The Retrospective Power Curve showed that adequate power was achieved. The survey unit is properly classified as Class 1. Therefore, in accordance with the LTP Section 5.10, the survey unit meets the release criteria. Survey unit B1-010-004 is acceptable for unrestricted release.

## 15. REFERENCES

1. LC-FS-PR-009, Final Status Survey Data Reporting
2. *La Crosse Boiling Water Reactor License Termination Plan (LTP)*
3. LC-FS-PR-002, *Final Status Survey Package Development*
4. NUREG-1575, Revision 1, *Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)*
5. *La Crosse Boiling Water Reactor Historical Site Assessment (HSA)*
6. RS-TD-313196-004, *LACBWR Soil DCGL, Basement Concrete DCGL, and Buried Pipe DCGL*
7. RS-TD-313196-001, *Radionuclides of Concern during LACBWR Decommissioning*
8. NUREG-1757, Volume 2, Revision 1, *Consolidated Decommissioning Guidance – Characterization, Survey, and Determination of Radiological Criteria, Final Report*
9. LC-FS-TSD-002, *Operational Derived Concentration Guideline Levels for Final Status Survey*
10. LC-QA-PN-001, *Final Status Survey Quality Assurance Project Plan (QAPP)*
11. LC-FS-PR-010, *Isolation and Control for Final Status Survey*
12. LC-FS-TSD-001, *Use of ISOCS for FSS of End State Sub Structures at LACBWR*
13. USNRC Inspection Procedure No. 84750, *Radioactive Waste Treatment, and Effluent and Environmental Monitoring*
14. LC-FS-PR-008, *Final Status Survey Data Assessment*

## 16. ATTACHMENTS

Attachment 1 – Figures and Maps

Attachment 2 – ISOCS Geometries

Attachment 3 – Sign Test

Attachment 4 – Quality Control Assessment

Attachment 5 – Graphical Presentations

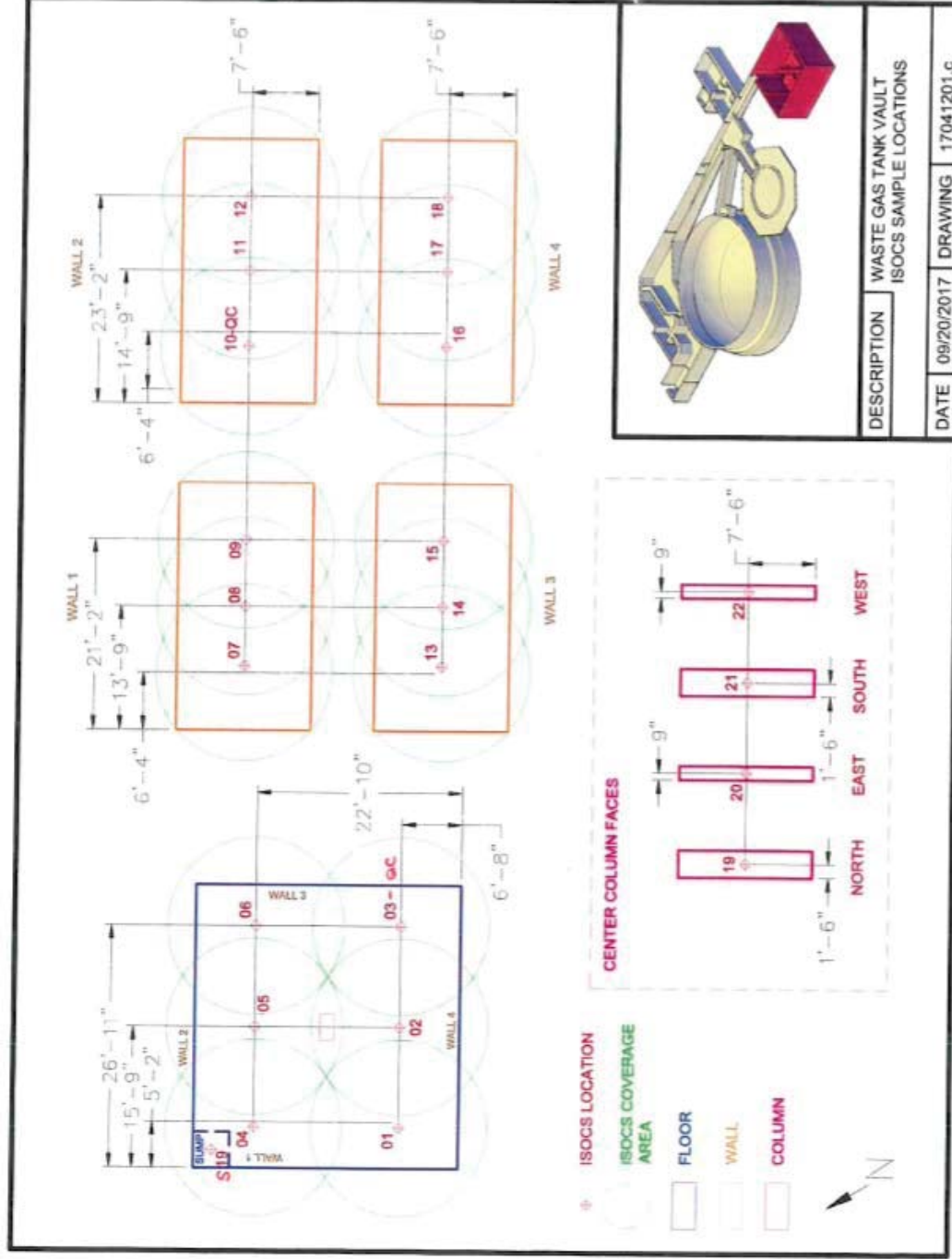
Attachment 6 – Measurement Analytical Reports

# **ATTACHMENT 1**

## **FIGURES AND MAPS**



Figure 16-1 – WGTV ISOCS Measurement Locations



# **ATTACHMENT 2**

## **ISOCS GEOMETRIES**

# Geometry Composer Report

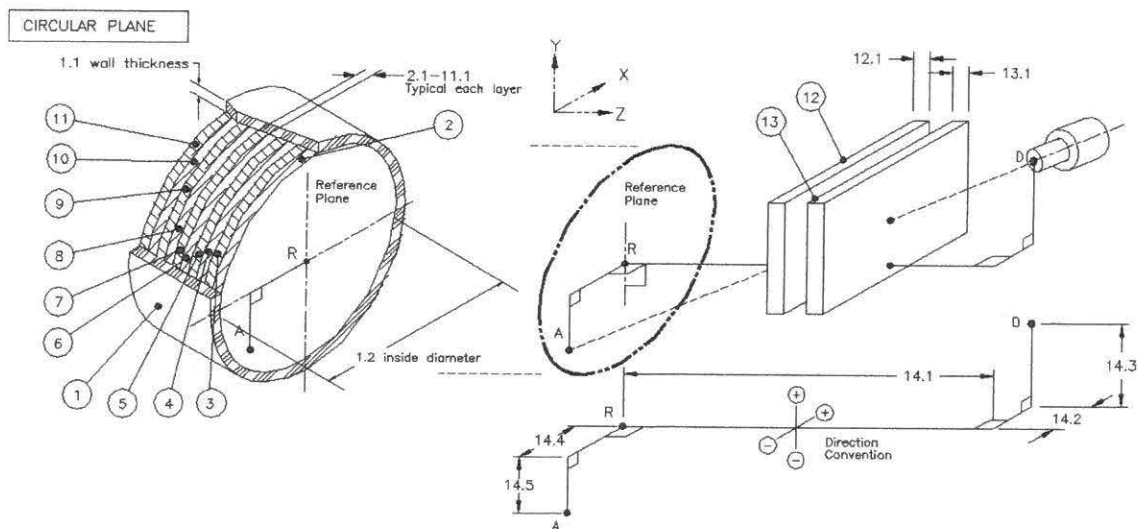
**Date:** Thursday, September 21, 2017 - 10:48:31  
**Description:** 3m\_circular\_plane\_90d\_  
**Comment:** shielding with 90 deg collimator  
**File Name:** C:\GENIE2K\isocs\data\GEOMETRY\In-Situ\CIRCULAR\_PLANE\3m\_circular\_plane\_90d\_.geo  
**Software:** ISOCS  
**Template:** CIRCULAR\_PLANE, Version: (default)  
**Detector:** 3844f  
**Collimator:** 50mm-90d new (newISOCS 50mm side 90deg collimation [large hole collimator])  
**Environment:** Temperature = 22 °C, Pressure = 760 mm Hg, Relative Humidity = 30%  
**Integration:** Convergence = 1.00%, MDRPN = 2<sup>4</sup> (16), CRPN = 2<sup>4</sup> (16)

## Dimensions (m)

No.	Description	d.1	d.2	d.3	d.4	d.5	d.6	Material	Density	Rel. Conc.
1	Side Walls	0.0009	6					dryair	0.0013	
2	Layer 1	0.0127						concrete	2.3	1.00
3	Layer 2	0						<none>		
4	Layer 3	0						<none>		
5	Layer 4	0						<none>		
6	Layer 5	0						<none>		
7	Layer 6	0						<none>		
8	Layer 7	0						<none>		
9	Layer 8	0						<none>		
10	Layer 9	0						<none>		
11	Layer 10	0						<none>		
12	Absorber1									
13	Absorber2									
14	Source-Detector	3	0	0	0	0				

## List of energies for efficiency curve generation

45.0      60.0      80.0      100.0      150.0      200.0      300.0      500.0  
700.0      1000.0      1400.0      2000.0



# Geometry Composer Report

---



**Date:** Thursday, September 21, 2017 - 10:48:31  
**Description:** 3m \_circular\_ plane\_90d\_  
**Comment:** shielding with 90 deg collimator  
**File Name:** C:\GENIE2K\isocs\data\GEOMETRY\In-Situ\CIRCULAR\_PLANE\3m\_circular\_plane\_90d\_.geo  
**Software:** ISOCS  
**Template:** CIRCULAR\_PLANE, Version: (default)



# Geometry Composer Report

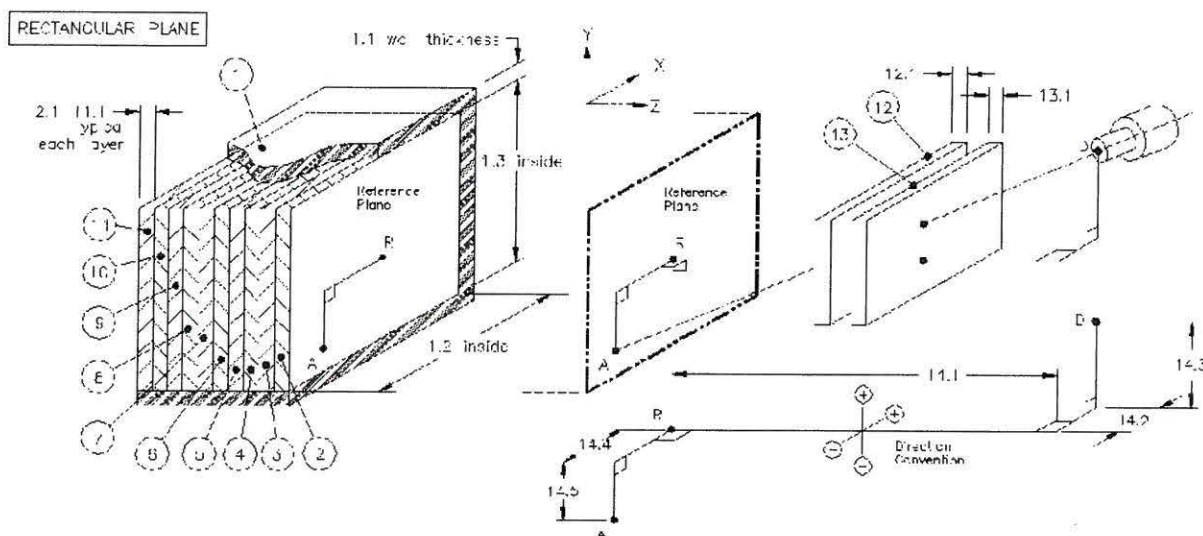
**Date:** Friday, September 29, 2017 - 10:28:11  
**Description:** LACBWR WGTV sump  
**Comment:** 1/2 in contam layer - 1.5m by 1.5m area - 1m distance from source  
**File Name:** C:\GENIE2K\isocs\data\GEOMETRY\In-Situ\RECTANGULAR\_PLANE\LACBWR WGTV sump.geo  
**Software:** ISOCS  
**Template:** RECTANGULAR\_PLANE, Version: (default)  
**Detector:** 3844f  
**Collimator:** 50mm-180d new (newISOCS 50mm side 180deg collimation [no collimator])  
**Environment:** Temperature = 22 °C, Pressure = 760 mm Hg, Relative Humidity = 30%  
**Integration:** Convergence = 1.00%, MDRPN = 2<sup>4</sup> (16), CRPN = 2<sup>4</sup> (16)

## Dimensions (cm)

No.	Description	d.1	d.2	d.3	d.4	d.5	d.6	Material	Density	Rel. Conc.
1	Side Walls	0	150	150				none		
2	Layer 1	1.27						concrete	2.3	1.00
3	Layer 2	0						<none>		
4	Layer 3	0						<none>		
5	Layer 4	0						<none>		
6	Layer 5	0						<none>		
7	Layer 6	0						<none>		
8	Layer 7	0						<none>		
9	Layer 8	0						<none>		
10	Layer 9	0						<none>		
11	Layer 10	0						<none>		
12	Absorber1									
13	Absorber2									
14	Source-Detector	100	0	0	0	0				

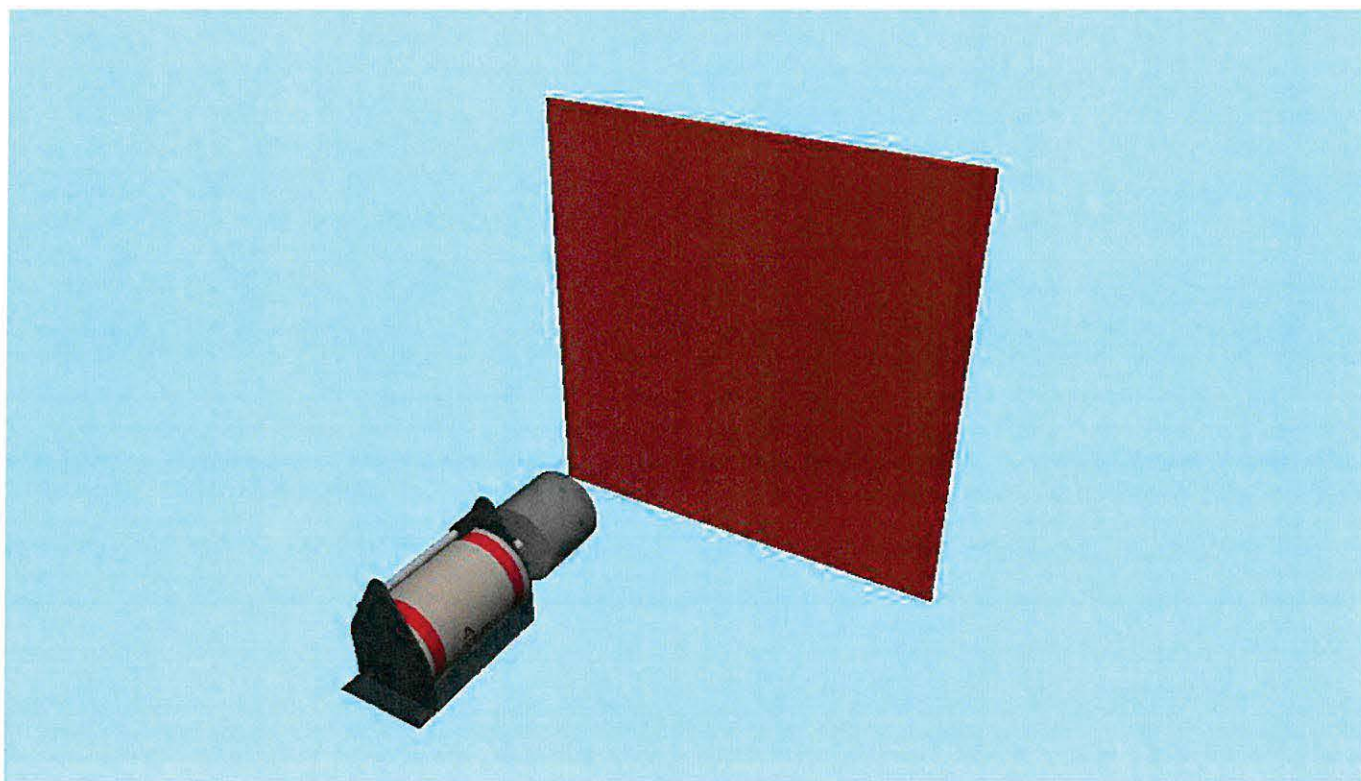
## List of energies for efficiency curve generation

59.5      88.0      122.1      165.9      391.7      661.7      898.0      1173.2  
 1332.5      1836.0



# Geometry Composer Report

**Date:** Friday, September 29, 2017 - 10:28:11  
**Description:** LACBWR WGTV sump  
**Comment:** 1/2 in contam layer - 1.5m by 1.5m area - 1m distance from source  
**File Name:** C:\GENIE2K\isocs\data\GEOMETRY\In-Situ\RECTANGULAR\_PLANE\LACBWR WGTV sump.geo  
**Software:** ISOCS  
**Template:** RECTANGULAR\_PLANE, Version: (default)



# **ATTACHMENT 3**

## **SIGN TEST**



**Table 16-1 – B1-010-004 Sign Test**

#	SOF (W <sub>s</sub> )	1-W <sub>s</sub>	Sign
1	0.1406	0.86	+1
2	0.1342	0.87	+1
3	0.1548	0.85	+1
4	0.1129	0.89	+1
5	0.1021	0.90	+1
6	0.0390	0.96	+1
7	0.0337	0.97	+1
8	0.0555	0.94	+1
9	0.0842	0.92	+1
10	0.0745	0.93	+1
11	0.0713	0.93	+1
12	0.2410	0.76	+1
13	0.1295	0.87	+1
14	0.1473	0.85	+1
15	0.2358	0.76	+1
16	0.2261	0.77	+1
17	0.1738	0.83	+1
18	0.0341	0.97	+1
19	0.0752	0.92	+1
20	0.0129	0.99	+1
21	0.0476	0.95	+1
22	0.0173	0.98	+1

Number of positive differences  
 (S+) 22

Critical Value 15

Survey Unit Meets  
 the Acceptance  
 Criteria

# **ATTACHMENT 4**

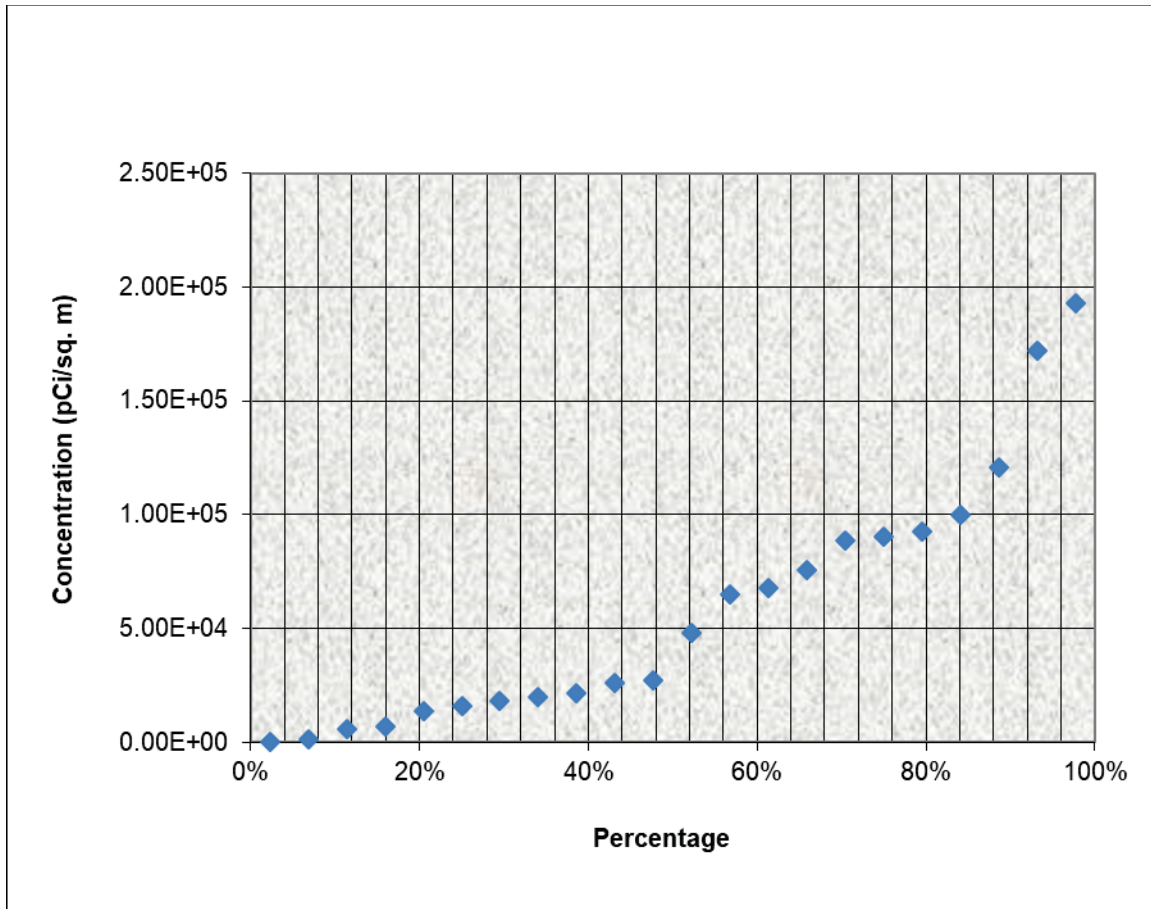
## **QUALITY CONTROL ASSESSMENT**

Two (2) replicate measurements were taken during the FSS of this basement structure. Typically, the measurement results are evaluated using USNRC acceptance criteria specified in Inspection Procedure No. 84750, *Radioactive Waste Treatment, and Effluent and Environmental Monitoring* (Reference 13). However, in the case of both of the pairs of standard and comparison measurements, there were no mutually identified radionuclides, and the method for acceptance from the above procedure cannot be utilized. In this case, because both pairs of standard and comparison measurements contained insignificant or no detectable radioactivity and all were well below the  $\text{OpDCGL}_B$ , no further action was deemed necessary.

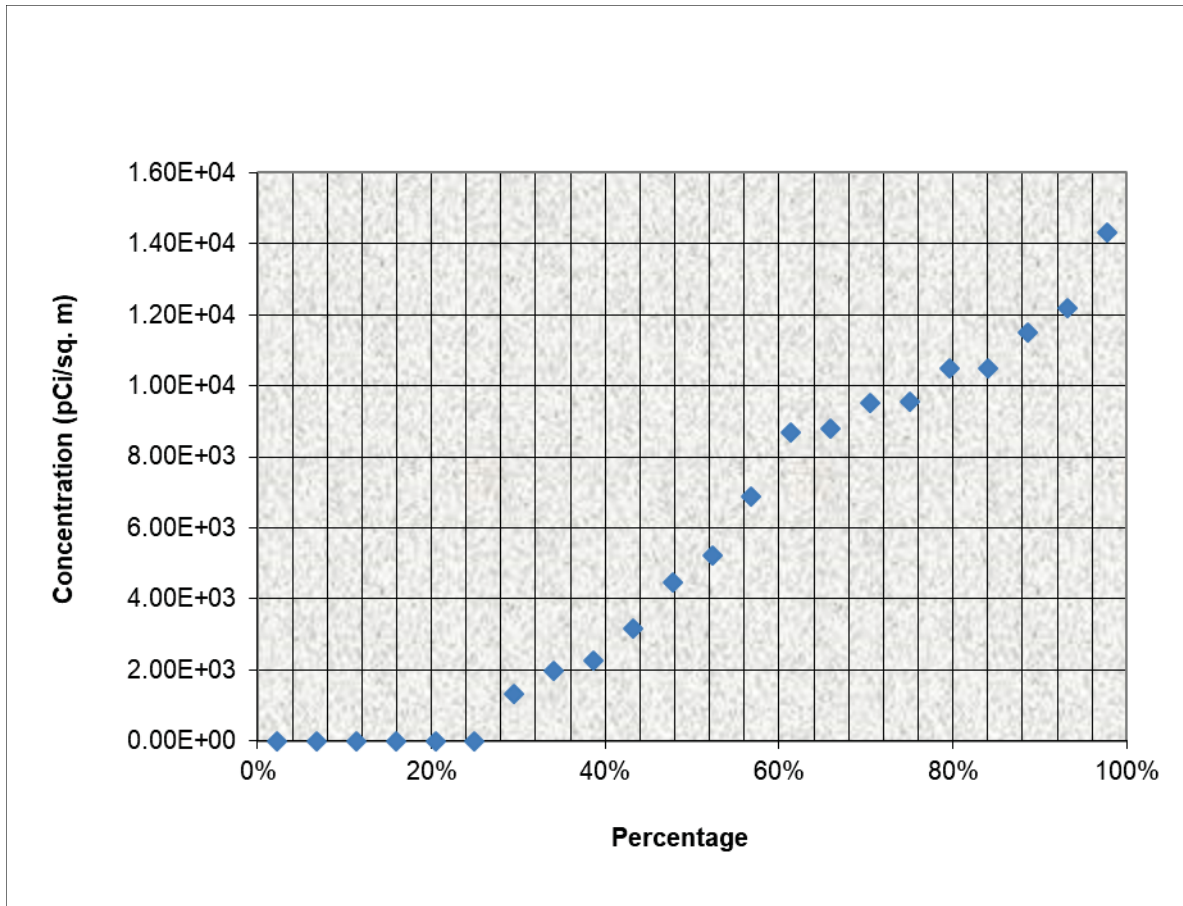
# **ATTACHMENT 5**

## **GRAPHICAL PRESENTATIONS**

Figure 16-2 - Quantile Plot for Cs-137 Concentration



**Figure 16-3 - Quantile Plot for Co-60 Concentration**



**Figure 16-4 - Quantile Plot for Eu-152 Concentration**

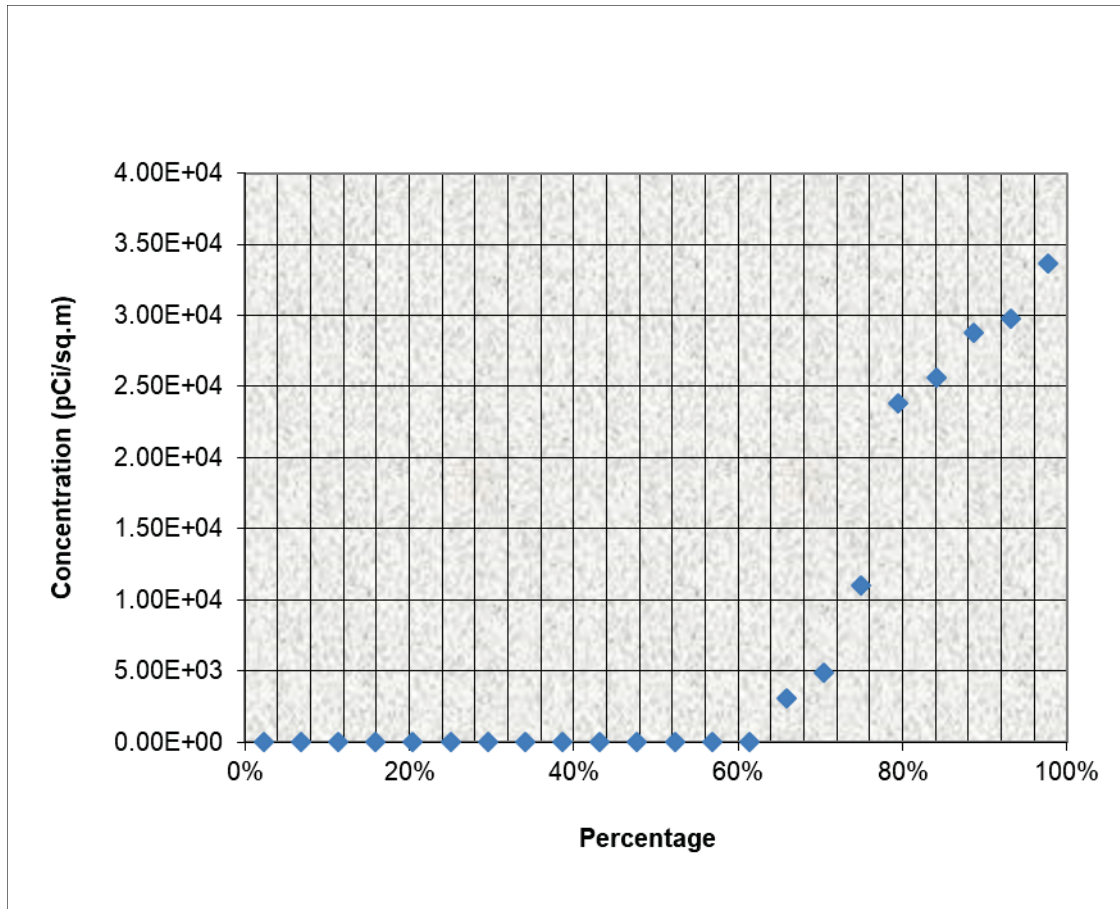
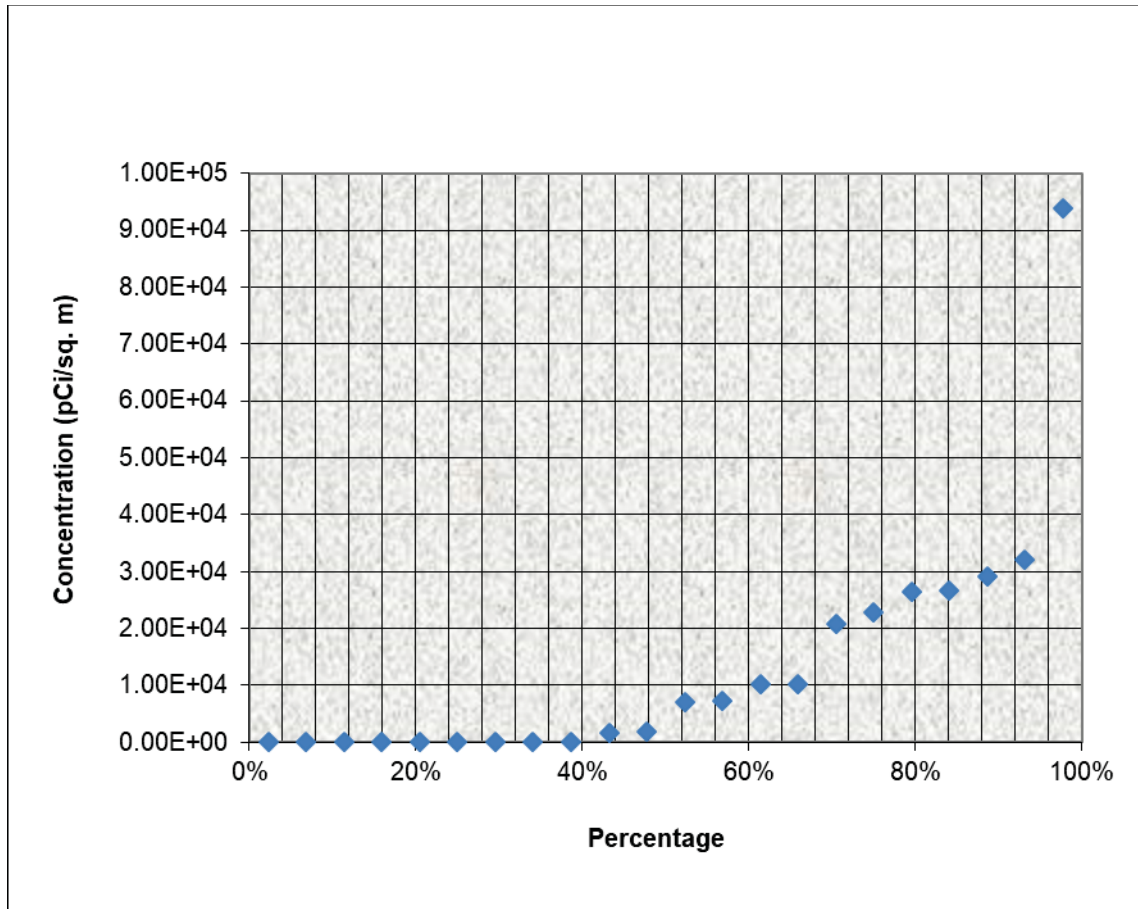
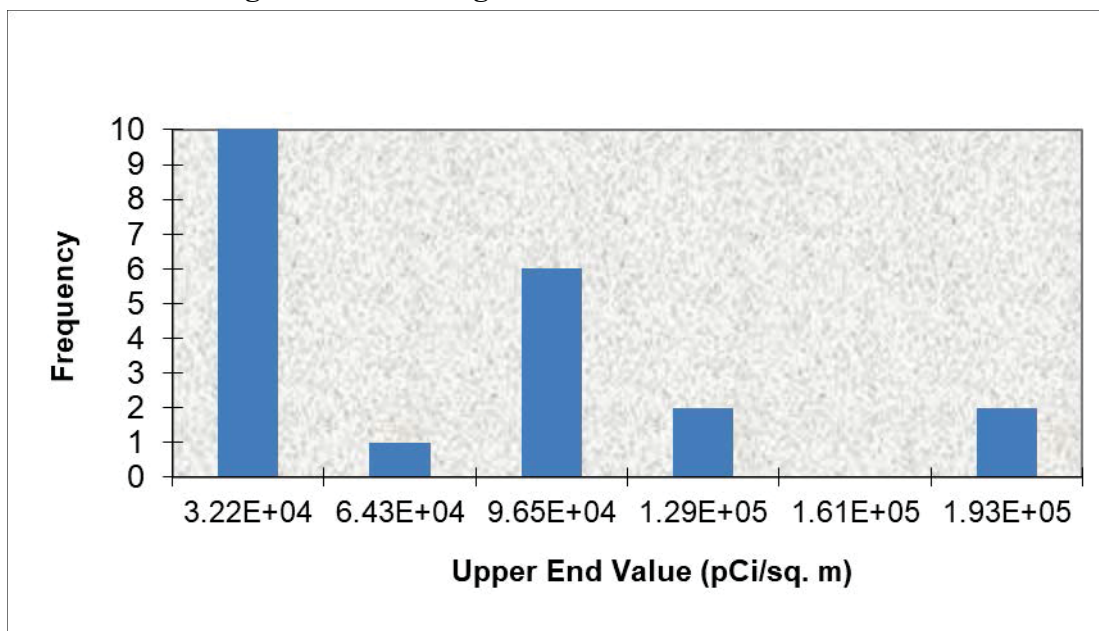




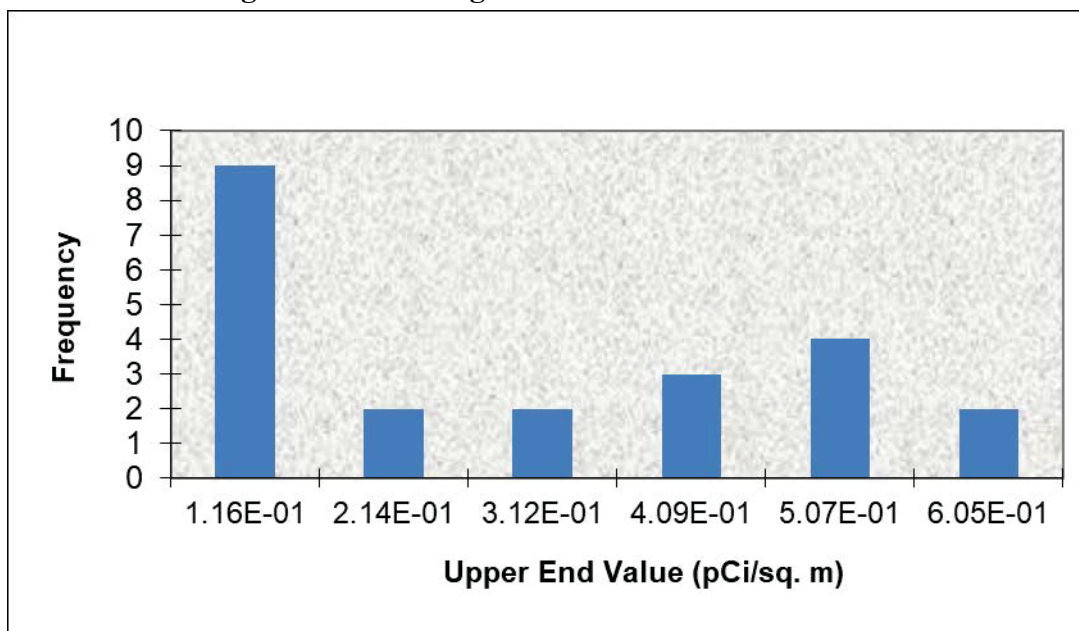
Figure 16-5 - Quantile Plot for Eu-154 Concentration



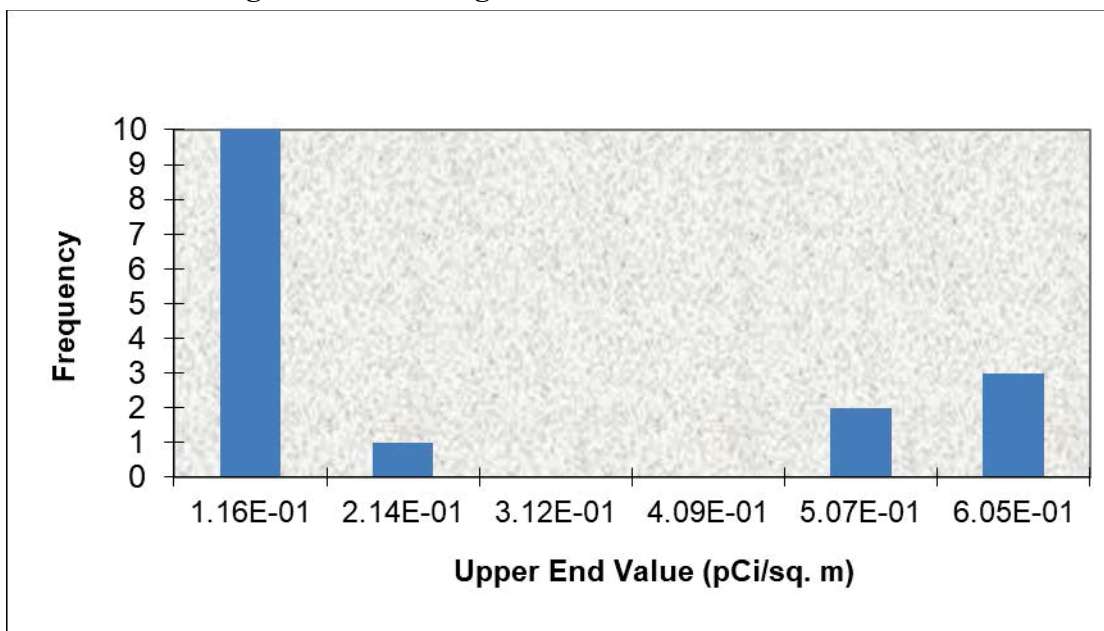
**Figure 16-6 - Histogram for Cs-137 Concentration**



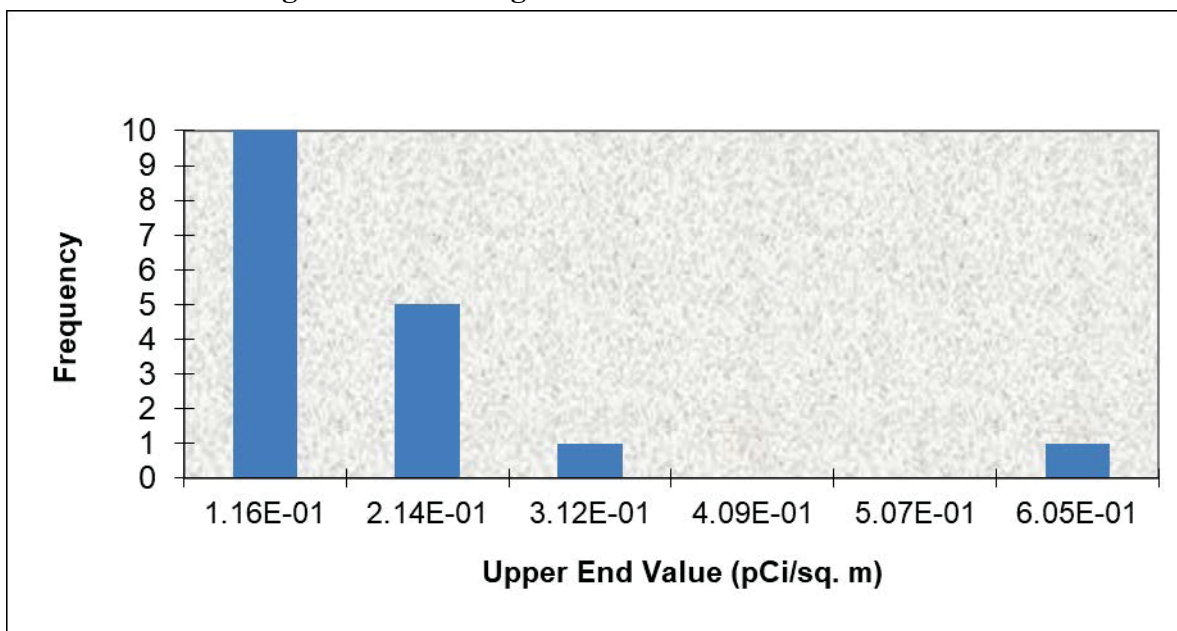
**Figure 16-7 - Histogram for Co-60 Concentration**



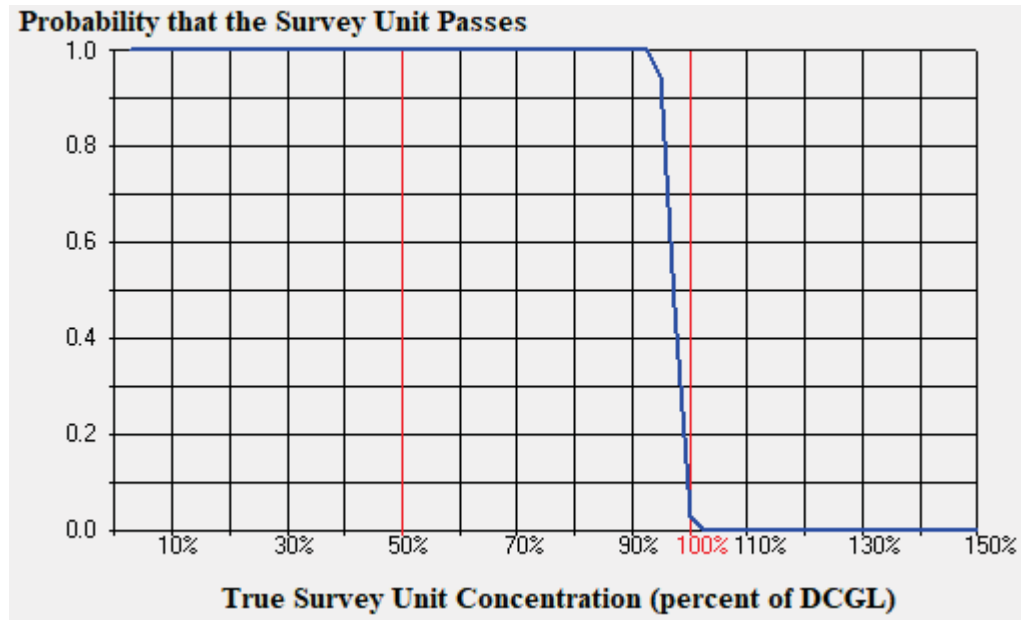
**Figure 16-8 - Histogram for Eu-152 Concentration**



**Figure 16-9 - Histogram for Eu-154 Concentration**



**Figure 16-10 - Retrospective Power Curve for B1-010-004**



# **ATTACHMENT 6**

## **MEASUREMENT ANALYTICAL REPORTS**

\*\*\*\*\*  
 \*\*\*\*\* G A M A S P E C T R U M A N A L Y S I S \*\*\*\*\*  
 \*\*\*\*\*

Filename: C:\Pete's Current Stuff\LaCrosse\ISOCS stuff\WGTV spectrums\W

Report Generated On : 9/29/2017 10:31:06 AM

Sample Title : WGTV Sump 1m 180 collimator - S19  
 Sample Description :  
 Sample Identification : WGTV\_180  
 Sample Type :  
 Sample Geometry :

Peak Locate Threshold : 3.00  
 Peak Locate Range (in channels) : 1 - 65535  
 Peak Area Range (in channels) : 1 - 8192  
 Identification Energy Tolerance : 2.000 keV

*revised  
 J. P. J.  
 9/29/17*

Sample Size : 1.000E+000 sq meter

Sample Taken On : 9/1/2017 9:14:00 AM  
 Acquisition Started : 9/1/2017 9:14:48 AM

Live Time : 600.0 seconds ✓  
 Real Time : 603.8 seconds

Dead Time : 0.63 % ✓

Energy Calibration Used Done On : 10/12/2016 ✓  
 Efficiency Calibration Used Done On : 9/29/2017 ✓  
 Efficiency ID : WGTV sump

\*\*\*\*\*  
\*\*\*\*\* P E A K A N A L Y S I S R E P O R T \*\*\*\*\*  
\*\*\*\*\*

Detector Name: 3844

Sample Title: WGTV Sump 1m 180 collimator

Peak Analysis Performed on: 9/29/2017 10:31:07 AM

Peak Analysis From Channel: 1

Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	69-	82	77.59	19.24	1.11	6.65E+002	53.64	8.04E+002
2	2635-	2661	2648.40	662.26	4.03	2.22E+004	211.59	5.14E+003
3	3235-	3246	3240.78	810.34	0.34	1.50E+001	9.61	3.00E+001
4	5320-	5351	5335.60	1333.76	2.54	4.56E+002	26.39	4.80E+001
5	5834-	5865	5850.14	1462.26	3.23	4.31E+002	27.40	6.39E+001

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000 sigma



\*\*\*\*\*  
\*\*\*\*\* N U C L I D E I D E N T I F I C A T I O N R E P O R T \*\*\*\*\*  
\*\*\*\*\*

Sample Title: WGTV Sump 1m 180 collimator

Nuclide Library Used: C:\GENIE2K\CAMFILES\ESClearance.NLB

## ..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/sq m)	Activity Uncertainty
K-40	0.919	1460.81*	10.67	3.48172E+006	2.63943E+005
CS-137	0.985	661.65*	85.12	1.31495E+007	7.99653E+005

\* = Energy line found in the spectrum.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 2.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000 sigma

\*\*\*\*\*  
\*\*\*\*\* I N T E R F E R E N C E C O R R E C T E D R E P O R T \*\*\*\*\*  
\*\*\*\*\*

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/sq m)	Wt mean Activity Uncertainty
K-40	0.919	3.481717E+006	2.639429E+005
CS-137	0.985	1.314950E+007	7.996531E+005

? = nuclide is part of an undetermined solution

X = nuclide rejected by the interference analysis

@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.000 sigma

## \*\*\*\*\* U N I D E N T I F I E D P E A K S \*\*\*\*\*

Peak Locate Performed on: 9/29/2017 10:31:07 AM  
Peak Locate From Channel: 1  
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	19.24	1.1077E+000	8.07		
3	810.34	2.5028E-002	64.00		
4	1333.76	7.6000E-001	5.79	Tol.	

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000 sigma

missed - E152  
CO-60  
NO INTERFERING  
@ 1173 KeV  
likely B.206

\*\*\*\*\*  
 \*\*\* G A M M A S E C T R U M A N A L Y S I S \*\*\*  
 \*\*\*\*\*

Filename: C:\GENIE2K\CAMFILES\9.16.17\WGTV-22 9.16.17.CNF

Report Generated On : 9/16/2017 2:12:22 PM  
 Sample Title : WGTV-22 09/16/2017  
 Sample Description :  
 Sample Identification :  
 Sample Type :  
 Sample Geometry : 3 m\_90d ✓  
 Peak Locate Threshold : 3.00  
 Peak Locate Range (in channels) : 1 - 65535  
 Peak Area Range (in channels) : 200 - 8000  
 Identification Energy Tolerance : 1.000 keV  
 Sample Size : 2.830E+001 m2 ✓  
 Sample Taken On : 9/16/2017 11:05:00 AM  
 Acquisition Started : 9/16/2017 11:06:09 AM  
 Live Time : 600.0 seconds ✓  
 Real Time : 600.2 seconds  
 Dead Time : 0.04 %

Energy Calibration Used Done On : 10/12/2016  
 Efficiency Calibration Used Done On : 12/16/2016  
 Efficiency ID : ULAR\_\_PLANE\_90D\_

*REVIEWED*  
*Joe Ogle*  
*10/2/17*

\*\*\*\*\*  
\*\*\* P E A K A N A L Y S I S R E P O R T \*\*\*  
\*\*\*\*\*

Detector Name: 3844

Sample Title: WGTV-22 09/16/2017

Peak Analysis Performed on: 9/16/2017 2:12:22 PM

Peak Analysis From Channel: 200

Peak Analysis To Channel: 8000

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	5830-	5860	5845.21	1461.03	1.34	1.78E+002	33.46	2.33E+001

= First peak in a multiplet region

= Other peak in a multiplet region

= Fitted singlet

Errors quoted at 1.960 sigma

\*\*\*\*\*  
 \*\*\* N U C L I D E I D E N T I F I C A T I O N R E P O R T \*\*\*  
 \*\*\*\*\*

Sample Title: WGTV-22 09/16/2017  
 Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/m2 )	Activity Uncertainty
K-40	0.992	1460.81*	10.67	1.06006E+006	2.17241E+005

\* = Energy line found in the spectrum.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.960 sigma

\*\*\*\*\*  
 \*\*\* INTERFERENCE CORRECTED REPORT \*\*\*  
 \*\*\*\*\*

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/m2 )	Wt mean Activity Uncertainty
K-40	0.992	1.060059E+006	2.172412E+005

? = Nuclide is part of an undetermined solution  
 X = Nuclide rejected by the interference analysis  
 @ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

\*\*\*\*\* UNIDENTIFIED PEAKS \*\*\*\*\*

Peak Locate Performed on: 9/16/2017 2:12:22 PM  
 Peak Locate From Channel: 200  
 Peak Locate To Channel: 8000

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
-------------	-----------------	-----------------------------------	---------------------------	--------------	-----------------

All peaks were identified.

\*\*\*\*\*  
\*\*\* N U C L I D E M D A R E P O R T \*\*\*  
\*\*\*\*\*

Detector Name: 3844  
Sample Geometry:  
Sample Title: WGTV-22 09/16/2017  
Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
+	K-40	1460.81*	10.67	2.2540E+005	2.25E+005	1.0601E+006
	SC-46	889.25	99.98	1.2987E+004	1.30E+004	-6.1499E+003
		1120.51	99.99	1.7632E+004		8.2276E+003
	CO-57	122.06	85.51	1.9641E+004	1.96E+004	1.0297E+004
		136.48	10.60	1.4396E+005		4.7886E+004
✓	CO-60	1173.22	100.00	1.6329E+004	1.60E+004	-1.5039E+004
		1332.49	100.00	1.6020E+004		3.1838E+003
	SE-75	96.73	3.41	5.7828E+005	2.09E+004	-6.7932E+004
		121.11	16.70	1.0029E+005		-5.8794E+002
		136.00	59.20	2.5848E+004		5.2415E+003
		198.60	1.45	8.6937E+005		-3.2840E+005
		264.65	59.80	2.0907E+004		-2.7634E+004
		279.53	25.20	4.7708E+004		-1.2884E+004
		303.91	1.32	8.8837E+005		-3.5562E+005
		400.65	11.40	1.1052E+005		-2.8877E+004
	KR-85	513.99	0.43	3.2750E+006	3.28E+006	1.5918E+006
	KR-85M	151.18	75.30	1.9273E+004	1.93E+004	6.5562E+003
		304.87	14.00	8.7495E+004		1.6830E+004
	SR-85	513.99	99.27	1.4187E+004	1.42E+004	6.8954E+003
	Y-88	898.02	93.40	1.4980E+004	9.99E+003	-1.8069E+004
		1836.01	99.38	9.9937E+003		-4.7644E+003
	CD-109	88.03	3.72	6.3533E+005	6.35E+005	2.8077E+005
	SN-113	255.12	1.93	6.1505E+005	1.78E+004	-4.0154E+005
		391.69	64.90	1.7847E+004		1.0167E+003
	CS-134	475.35	1.46	8.4865E+005	1.60E+004	-4.6122E+005
		563.23	8.38	1.4320E+005		-3.6382E+004
		569.32	15.43	7.7657E+004		3.7280E+004
		604.70	97.60	1.6068E+004		1.5294E+004
		795.84	85.40	1.6004E+004		-1.1981E+003
		801.93	8.73	1.5199E+005		-1.5506E+005
		1038.57	1.00	1.3561E+006		-2.4172E+006
		1167.94	1.80	8.6734E+005		-3.1072E+005
		1365.15	3.04	3.6135E+005		8.9199E+004
	CS-136	66.91	12.50	3.1629E+005	1.38E+004	-1.3699E+005
		86.29	6.30	3.8676E+005		5.6541E+004
		153.22	7.46	1.9046E+005		6.6531E+004
		163.89	4.61	2.9490E+005		-1.4642E+005
		176.55	13.56	9.7882E+004		-6.5684E+004
		273.65	12.66	9.8316E+004		-9.2915E+003
		340.57	48.50	2.5046E+004		-9.3948E+003

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
CS-136	818.50	99.70	1.3821E+004	1.38E+004	4.5672E+003
	1048.07	79.60	1.9530E+004		-6.5947E+003
	1235.34	19.70	1.0146E+005		4.7284E+004
CS-137 ✓	661.65	85.12	3.0508E+004	3.05E+004	8.8773E+004
CS-138	138.10	1.49	1.1675E+006	1.01E+004	3.9845E+005
	227.76	1.51	9.7649E+005		-4.2252E+005
	408.98	4.66	3.1419E+005		3.2436E+005
	462.79	30.70	4.6264E+004		-9.4684E+003
	546.94	10.80	1.3153E+005		5.4030E+004
	871.80	5.11	3.0954E+005		2.4187E+005
	1009.78	29.80	5.9416E+004		1.7934E+004
	1147.22	1.24	1.3539E+006		-1.0143E+006
	1343.59	1.14	1.3444E+006		1.0781E+006
	1435.86	76.30	1.0095E+004		-2.1881E+003
CE-139 ✓	165.85	80.35	1.7824E+004	1.78E+004	1.0974E+004
EU-152 ✓	121.78	28.40	5.9123E+004	4.52E+004	2.9842E+004
	244.69	7.49	1.7197E+005		-6.7990E+004
	344.27	26.50	4.5225E+004		-6.0610E+004
	411.11	2.21	5.5474E+005		-2.4656E+005
	443.98	3.11	3.8170E+005		1.4963E+005
	778.89	12.74	9.8332E+004		-2.6903E+004
	867.32	4.16	3.1995E+005		-3.8566E+005
	964.01	14.40	1.1526E+005		1.1552E+004
	1085.78	10.00	1.4201E+005		5.4196E+004
	1112.02	13.30	1.0849E+005		-5.2606E+004
	1407.95	20.70	6.5417E+004		5.0804E+004
EU-154 J	123.07	40.40	4.0646E+004	4.06E+004	-2.2781E+004
	188.25	0.23	5.6765E+006		-2.3601E+005
	247.93	6.83	1.8199E+005		7.3320E+004
	401.30	0.19	6.4717E+006		-4.7914E+006
	444.39	0.55	2.1319E+006		-6.9226E+005
	478.26	0.21	6.0782E+006		4.2162E+006
	557.56	0.25	4.9937E+006		2.6706E+006
	582.00	0.89	1.7081E+006		1.4393E+006
	591.76	4.91	2.7242E+005		-1.0191E+005
	625.22	0.32	3.7966E+006		3.5944E+005
	676.59	0.14	9.4748E+006		-1.9838E+005
	692.42	1.78	6.8994E+005		4.9345E+005
	715.76	0.17	6.8629E+006		-6.1564E+006
	722.30	20.00	6.8744E+004		-3.3661E+004
	756.86	4.50	2.6207E+005		-4.2895E+005
	815.55	0.50	2.9011E+006		4.7043E+005
	845.39	0.58	2.3434E+006		8.6911E+005
	850.64	0.23	5.7862E+006		1.8182E+006
	873.20	12.09	1.1352E+005		-8.3408E+003
	892.73	0.50	2.6682E+006		-1.1828E+006
	904.05	0.85	1.8501E+006		-1.9339E+006
	996.30	10.34	1.2099E+005		-7.3149E+003
	1004.76	17.90	8.5475E+004		-9.2010E+003
	1128.40	0.29	6.0658E+006		1.8729E+006



Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
EU-154	1140.90	0.22	6.9147E+006	4.06E+004	1.6352E+005
	1241.60	0.13	1.4496E+007		-3.6655E+005
	1246.60	0.80	2.3153E+006		2.3867E+006
	1274.51	34.40	4.8112E+004		4.2039E+003
	1494.08	0.71	1.2894E+006		5.4855E+005
	1596.45	1.80	6.0015E+005		3.0261E+005
HG-203	279.19	77.30	1.5443E+004	1.54E+004	-7.3738E+003
BI-214	609.31	46.30	3.5374E+004	3.54E+004	1.6101E+004
	768.36	5.04	2.9269E+005		1.9585E+005
	806.17	1.23	1.1579E+006		2.6459E+004
	934.06	3.21	4.5341E+005		-1.0473E+004
	1120.29	15.10	1.1673E+005		5.4473E+004
	1155.19	1.69	9.4340E+005		3.9846E+005
	1238.11	5.94	3.2064E+005		1.5261E+005
	1280.96	1.47	9.6852E+005		1.5390E+005
	1377.67	4.11	2.8884E+005		-5.7024E+002
	1385.31	0.78	1.6252E+006		-1.1566E+006
	1401.50	1.39	7.3904E+005		-6.7632E+005
	1407.98	2.48	5.4603E+005		4.2405E+005
	1509.19	2.19	5.6065E+005		3.5741E+005
	1661.28	1.15	6.5701E+005		-4.5266E+005
	1729.60	3.05	3.5635E+005		-1.9494E+004
	1764.49	15.80	9.9155E+004		3.9682E+004
	1847.44	2.12	4.7069E+005		1.7952E+005
	2118.54	1.21	0.0000E+000		0.0000E+000
	74.81	6.33	5.1166E+005	3.90E+004	4.1643E+005
	77.11	10.70	2.7056E+005		-1.4513E+005
	87.20	3.70	6.4735E+005		-1.8515E+004
	89.80	1.03	2.2012E+006		-2.8900E+005
	241.98	7.49	1.8210E+005		1.1793E+005
	295.21	19.20	6.5747E+004		2.3015E+004
	351.92	37.20	3.9005E+004		3.5678E+004
	785.91	1.10	1.3371E+006		-7.2519E+004

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or has not been calculated

@ = Half-life too short to be able to perform the decay correction

\*\*\*\*\*  
 \*\*\* G A M M A S E C T R U M A N A L Y I S \*\*\*  
 \*\*\*\*\*

Filename: 3844

Report Generated On : 9/18/2017 9:21:06 AM

Sample Title : WGTV 21 ✓  
 Sample Description :  
 Sample Identification :  
 Sample Type :  
 Sample Geometry : 3m\_90d ✓

Peak Locate Threshold : 3.00  
 Peak Locate Range (in channels) : 1 - 65535  
 Peak Area Range (in channels) : 200 - 8000  
 Identification Energy Tolerance : 1.000 keV

Sample Size : 2.830E+001 m2 ✓

Sample Taken On : 9/18/2017 9:10:00 AM  
 Acquisition Started : 9/18/2017 9:11:05 AM

Live Time : 600.0 seconds ✓  
 Dead Time : 600.2 seconds

Bad Time : 0.03 % ✓

Energy Calibration Used Done On : 10/12/2016  
 Efficiency Calibration Used Done On : 12/16/2016  
 Efficiency ID : ULAR\_\_PLANE\_90D\_

*Reviewed  
 Jm Dg  
 10/2/17*

Peak analysis results available for reporting purposes

\*\*\*\*\*  
 \*\*\* N U C L I D E I D E N T I F I C A T I O N R E P O R T \*\*\*  
 \*\*\*\*\*

Sample Title: WGTV 21  
 Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/m2 )	Activity Uncertainty
-----------------	------------------	-----------------	--------------	-----------------------	-------------------------

\* = Energy line found in the spectrum.  
 @ = Energy line not used for Weighted Mean Activity  
 Energy Tolerance : 1.000 keV  
 Nuclide confidence index threshold = 0.30  
 Errors quoted at 1.960 sigma

\*\*\*\*\*  
 \*\*\* I N T E R F E R E N C E C O R R E C T E D R E P O R T \*\*\*  
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Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/m2 )	Wt mean Activity Uncertainty
-----------------	-----------------------------	----------------------------------	------------------------------------

? = Nuclide is part of an undetermined solution

X = Nuclide rejected by the interference analysis

@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

Peak search results available for nuclide analysis.

\*\*\*\*\*  
\*\*\* N U C L I D E M D A R E P O R T \*\*\*  
\*\*\*\*\*

Detector Name: 3844  
Sample Geometry: 3m 90d  
Sample Title: WGTV 21  
Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
K-40	1460.81	10.67	4.5041E+005	4.50E+005	1.4610E+006
SC-46	889.25	99.98	1.4915E+004	1.49E+004	1.6206E+004
	1120.51	99.99	1.7819E+004		8.6559E+003
CO-57	122.06	85.51	1.8911E+004	1.89E+004	1.1141E+003
	136.48	10.60	1.4283E+005		1.9226E+004
CO-60	1173.22	100.00	1.8752E+004	1.27E+004	3.0102E+003
	1332.49	100.00	1.2703E+004		5.2236E+003
SE-75	96.73	3.41	5.8528E+005	2.15E+004	1.0581E+005
	121.11	16.70	9.6764E+004		-8.7736E+004
	136.00	59.20	2.5814E+004		1.1284E+004
	198.60	1.45	8.5351E+005		2.1603E+005
	264.65	59.80	2.1541E+004		1.8872E+003
	279.53	25.20	4.6460E+004		5.4296E+003
	303.91	1.32	8.8504E+005		-2.3687E+005
	400.65	11.40	1.0385E+005		8.7436E+004
KR-85	513.99	0.43	3.5218E+006	3.52E+006	1.3928E+006
KR-85M	151.18	75.30	1.8226E+004	1.82E+004	-7.4547E+003
	304.87	14.00	8.5277E+004		2.0142E+004
SR-85	513.99	99.27	1.5256E+004	1.53E+004	6.0332E+003
Y-88	898.02	93.40	1.4595E+004	1.08E+004	-1.8776E+003
	1836.01	99.38	1.0751E+004		4.5738E+003
CD-109	88.03	3.72	6.3010E+005	6.30E+005	1.5315E+004
SN-113	255.12	1.93	6.0951E+005	1.71E+004	-2.3390E+005
	391.69	64.90	1.7133E+004		-1.1974E+004
CS-134	475.35	1.46	8.9683E+005	1.51E+004	7.2421E+005
	563.23	8.38	1.4447E+005		-1.5929E+004
	569.32	15.43	7.4046E+004		-2.4759E+004
	604.70	97.60	1.5129E+004		1.4835E+004
	795.84	85.40	1.5269E+004		-5.9393E+003
	801.93	8.73	1.5381E+005		9.9551E+004
	1038.57	1.00	1.6023E+006		9.4749E+005
	1167.94	1.80	1.0176E+006		5.9940E+005
	1365.15	3.04	3.3200E+005		-3.8849E+005
CS-136	66.91	12.50	3.1784E+005	1.30E+004	-5.9039E+004
	86.29	6.30	3.8036E+005		-1.4902E+005
	153.22	7.46	1.8081E+005		6.3033E+004
	163.89	4.61	2.9066E+005		1.2053E+005
	176.55	13.56	9.8386E+004		2.3259E+004
	273.65	12.66	9.3277E+004		1.7966E+004
	340.57	48.50	2.6255E+004		9.4059E+003

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
CS-136	818.50	99.70	1.3003E+004	1.30E+004	-6.8817E+003
	1048.07	79.60	1.9530E+004		3.8532E+002
	1235.34	19.70	7.9853E+004		-3.5235E+004
CS-137	661.65	85.12	2.8707E+004	2.87E+004	6.7480E+004
CS-138	138.10	1.49	1.1354E+006	1.82E+004	-3.5980E+005
	227.76	1.51	1.0111E+006		-1.1013E+005
	408.98	4.66	2.9665E+005		6.5639E+004
	462.79	30.70	4.8965E+004		5.5565E+004
	546.94	10.80	1.3442E+005		5.8085E+004
	871.80	5.11	3.3115E+005		1.7447E+005
	1009.78	29.80	5.4874E+004		-1.5508E+004
	1147.22	1.24	1.4763E+006		-3.0561E+004
	1343.59	1.14	1.2397E+006		4.3965E+005
	1435.86	76.30	1.8245E+004		-1.1707E+003
CE-139	165.85	80.35	1.6796E+004	1.68E+004	3.7266E+003
EU-152	121.78	28.40	5.6700E+004	4.42E+004	-3.9410E+004
	244.69	7.49	1.6258E+005		-6.9606E+004
	344.27	26.50	4.4240E+004		-5.4891E+004
	411.11	2.21	5.5474E+005		2.5890E+005
	443.98	3.11	4.1222E+005		1.1324E+005
	778.89	12.74	1.0331E+005		1.5888E+004
	867.32	4.16	3.3659E+005		-1.6198E+005
	964.01	14.40	1.1526E+005		1.3446E+005
	1085.78	10.00	1.3970E+005		-6.0630E+004
	1112.02	13.30	1.0124E+005		-1.5782E+005
	1407.95	20.70	6.1939E+004		-3.7804E+004
EU-154	123.07	40.40	4.0347E+004	4.03E+004	3.1973E+004
	188.25	0.23	5.5528E+006		5.2062E+005
	247.93	6.83	1.7161E+005		-1.1092E+005
	401.30	0.19	6.0729E+006		1.4343E+006
	444.39	0.55	2.3578E+006		1.9091E+006
	478.26	0.21	5.9646E+006		-2.5671E+006
	557.56	0.25	4.6730E+006		-4.2631E+005
	582.00	0.89	1.7744E+006		1.4864E+006
	591.76	4.91	2.5521E+005		-2.0378E+005
	625.22	0.32	4.0944E+006		1.2556E+006
	676.59	0.14	8.9869E+006		-3.6101E+006
	692.42	1.78	6.3200E+005		-5.4655E+004
	715.76	0.17	7.7215E+006		1.0455E+005
	722.30	20.00	7.3825E+004		-1.2806E+004
	756.86	4.50	2.3448E+005		-1.2794E+005
	815.55	0.50	2.7167E+006		1.1547E+006
	845.39	0.58	2.0316E+006		-3.0580E+005
	850.64	0.23	5.3134E+006		-1.7704E+006
	873.20	12.09	1.2181E+005		6.1166E+004
	892.73	0.50	2.9538E+006		6.3773E+005
	904.05	0.85	1.6325E+006		-3.1994E+006
	996.30	10.34	1.3576E+005		-6.4323E+004
	1004.76	17.90	8.1138E+004		5.8139E+004
	1128.40	0.29	5.8003E+006		-9.9912E+006



Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
EU-154	1140.90	0.22	7.0180E+006	4.03E+004	8.5850E+005
	1241.60	0.13	1.3095E+007		5.1669E+006
	1246.60	0.80	2.0384E+006		-3.9989E+005
	1274.51	34.40	4.4445E+004		-1.9403E+002
	1494.08	0.71	1.6582E+006		4.4881E+005
	1596.45	1.80	6.3035E+005		3.4044E+005
HG-203	279.19	77.30	1.4824E+004	1.48E+004	-1.1706E+004
BI-214	609.31	46.30	3.2672E+004	3.27E+004	2.4077E+004
	768.36	5.04	3.1314E+005		1.8123E+005
	806.17	1.23	1.1335E+006		6.0447E+005
	934.06	3.21	4.6444E+005		-1.0067E+005
	1120.29	15.10	1.1797E+005		5.7308E+004
	1155.19	1.69	9.0353E+005		3.2639E+005
	1238.11	5.94	2.7328E+005		2.7499E+004
	1280.96	1.47	1.0614E+006		1.0661E+006
	1377.67	4.11	3.4862E+005		9.5258E+004
	1385.31	0.78	1.7600E+006		-1.3221E+006
	1401.50	1.39	9.9545E+005		-5.5805E+005
	1407.98	2.48	5.1700E+005		-3.1555E+005
	1509.19	2.19	5.1883E+005		2.9784E+005
	1661.28	1.15	6.5701E+005		-1.0579E+006
	1729.60	3.05	3.3468E+005		1.4239E+005
	1764.49	15.80	1.0937E+005		9.3028E+004
	1847.44	2.12	5.3913E+005		2.5132E+005
	2118.54	1.21	0.0000E+000		0.0000E+000
	74.81	6.33	4.9495E+005	3.29E+004	3.6669E+005
	77.11	10.70	2.6153E+005		-1.5635E+004
	87.20	3.70	6.4335E+005		2.1742E+005
	89.80	1.03	2.2151E+006		8.8854E+005
	241.98	7.49	1.7819E+005		1.9210E+005
	295.21	19.20	6.5543E+004		-5.1048E+004
	351.92	37.20	3.2873E+004		-2.5750E+003
	785.91	1.10	1.1897E+006		-1.4712E+005

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or has not been calculated

@ = Half-life too short to be able to perform the decay correction

Filename: 3844

Report Generated On : 9/16/2017 1:34:34 PM

Sample Title : WGTV-20 09/16/2017 ✓

Sample Description :

Sample Identification :

Sample Type :

Sample Geometry : 3m-90d ✓

Peak Locate Threshold : 3.00

Peak Locate Range (in channels) : 1 - 65535

Peak Area Range (in channels) : 200 - 8000

Identification Energy Tolerance : 1.000 keV

Sample Size : 2.830E+001 m2 ✓

Sample Taken On : 9/16/2017 1:24:00 PM ✓

Acquisition Started : 9/16/2017 1:24:33 PM ✓

Live Time : 600.0 seconds ✓

Real Time : 600.2 seconds

Dead Time : 0.04 % ✓

Energy Calibration Used Done On : 10/12/2016

Efficiency Calibration Used Done On : 12/16/2016

Efficiency ID : ULAR\_\_PLANE\_90D\_

*REVIEWED*  
*Joe O'Neil*  
*10/2/17*

Peak analysis results available for reporting purposes

\*\*\*\*\*  
 \*\*\* N U C L I D E I D E N T I F I C A T I O N R E P O R T \*\*\*  
 \*\*\*\*\*

Sample Title: WGTV-20 09/16/2017  
 Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/m2 )	Activity Uncertainty
-----------------	------------------	-----------------	--------------	-----------------------	-------------------------

\* = Energy line found in the spectrum.  
 @ = Energy line not used for Weighted Mean Activity  
 Energy Tolerance : 1.000 keV  
 Nuclide confidence index threshold = 0.30  
 Errors quoted at 1.960 sigma

\*\*\*\*\*  
 \*\*\* I N T E R F E R E N C E C O R R E C T E D R E P O R T \*\*\*  
 \*\*\*\*\*

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/m2 )	Wt mean Activity Uncertainty
-----------------	-----------------------------	----------------------------------	------------------------------------

? = Nuclide is part of an undetermined solution  
 X = Nuclide rejected by the interference analysis  
 @ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

o peak search results available for nuclide analysis.

\*\*\*\*\*  
\*\*\* N U C L I D E M D A R E P O R T \*\*\*  
\*\*\*\*\*

Detector Name: 3844  
Sample Geometry:  
Sample Title: WGTV-20 09/16/2017  
Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
K-40	1460.81	10.67	4.2390E+005	4.24E+005	1.0777E+006
SC-46	889.25	99.98	1.2602E+004	1.26E+004	1.4674E+003
	1120.51	99.99	1.4964E+004		-1.0705E+004
CO-57	122.06	85.51	1.9572E+004	1.96E+004	1.1237E+004
	136.48	10.60	1.4283E+005		-6.8671E+004
CO-60	1173.22	100.00	1.6971E+004	1.60E+004	3.0952E+003
	1332.49	100.00	1.6020E+004		1.2249E+004
SE-75	96.73	3.41	5.7442E+005	2.07E+004	1.4348E+005
	121.11	16.70	9.9573E+004		-3.6856E+004
	136.00	59.20	2.5509E+004		-1.7994E+004
	198.60	1.45	9.3326E+005		5.1772E+005
	264.65	59.80	2.0671E+004		-6.9373E+003
	279.53	25.20	4.8167E+004		1.0248E+004
	303.91	1.32	9.0484E+005		6.0289E+005
	400.65	11.40	1.0556E+005		5.4578E+004
KR-85	513.99	0.43	3.8916E+006	3.89E+006	-2.2173E+005
KR-85M	151.18	75.30	1.9821E+004	1.98E+004	-1.6138E+004
	304.87	14.00	8.5159E+004		-8.9604E+004
SR-85	513.99	99.27	1.6857E+004	1.69E+004	-9.6048E+002
Y-88	898.02	93.40	1.4789E+004	8.21E+003	2.0056E+003
	1836.01	99.38	8.2060E+003		-1.3340E+003
CD-109	88.03	3.72	6.1006E+005	6.10E+005	1.0138E+005
SN-113	255.12	1.93	6.1689E+005	1.79E+004	4.7630E+003
	391.69	64.90	1.7947E+004		-1.8696E+004
CS-134	475.35	1.46	9.4732E+005	1.59E+004	-2.0620E+005
	563.23	8.38	1.6662E+005		1.2873E+005
	569.32	15.43	8.1095E+004		1.8852E+004
	604.70	97.60	1.5885E+004		7.1243E+003
	795.84	85.40	1.9228E+004		1.1203E+004
	801.93	8.73	1.7242E+005		-6.7795E+003
	1038.57	1.00	1.4434E+006		2.5834E+005
	1167.94	1.80	1.0069E+006		4.8062E+005
	1365.15	3.04	3.1609E+005		1.5938E+005
CS-136	66.91	12.50	3.0680E+005	1.33E+004	-1.7755E+005
	86.29	6.30	3.7630E+005		2.8441E+005
	153.22	7.46	1.9860E+005		-7.9194E+004
	163.89	4.61	2.9629E+005		1.1972E+002
	176.55	13.56	1.0200E+005		6.8224E+004
	273.65	12.66	9.5681E+004		3.7731E+004
	340.57	48.50	2.6838E+004		2.4283E+004

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
CS-136	818.50	99.70	1.3336E+004	1.33E+004	-1.3728E+004
	1048.07	79.60	1.9028E+004		1.7923E+004
	1235.34	19.70	1.0703E+005		1.0080E+005
CS-137	661.65	85.12	2.9441E+004	2.94E+004	6.5119E+004
CS-138	138.10	1.49	1.1239E+006	1.92E+004	-5.5567E+005
	227.76	1.51	9.5977E+005		-8.0364E+005
	408.98	4.66	2.8356E+005		-1.0601E+003
	462.79	30.70	4.8667E+004		-9.7794E+003
	546.94	10.80	1.3087E+005		4.1882E+004
	871.80	5.11	3.3083E+005		-6.8987E+004
	1009.78	29.80	4.9394E+004		-4.7907E+004
	1147.22	1.24	1.3788E+006		-5.2091E+005
	1343.59	1.14	1.1894E+006		-1.0559E+004
	1435.86	76.30	1.9188E+004		5.6474E+003
CE-139	165.85	80.35	1.6796E+004	1.68E+004	-2.0703E+003
EU-152	121.78	28.40	5.8773E+004	4.73E+004	4.8886E+003
	244.69	7.49	1.8399E+005		8.6216E+004
	344.27	26.50	4.7317E+004		-6.4759E+004
	411.11	2.21	5.4877E+005		-1.2966E+005
	443.98	3.11	4.2552E+005		1.5063E+005
	778.89	12.74	9.3061E+004		-5.4271E+004
	867.32	4.16	3.7828E+005		2.5201E+005
	964.01	14.40	1.1526E+005		2.9145E+004
	1085.78	10.00	1.5914E+005		1.4862E+005
	1112.02	13.30	1.1686E+005		-1.6985E+005
	1407.95	20.70	6.1939E+004		2.1666E+004
EU-154	123.07	40.40	4.1190E+004	4.12E+004	2.6647E+004
	188.25	0.23	5.7272E+006		-8.2130E+005
	247.93	6.83	1.8531E+005		-1.0924E+005
	401.30	0.19	6.1752E+006		9.5757E+005
	444.39	0.55	2.3452E+006		-1.2998E+006
	478.26	0.21	6.4415E+006		-2.7009E+006
	557.56	0.25	4.9937E+006		1.9773E+006
	582.00	0.89	1.6984E+006		1.4065E+006
	591.76	4.91	2.5743E+005		-4.6513E+003
	625.22	0.32	4.0585E+006		-1.9825E+006
	676.59	0.14	9.3794E+006		-1.2628E+006
	692.42	1.78	6.8200E+005		-7.6252E+004
	715.76	0.17	8.2654E+006		2.9632E+006
	722.30	20.00	7.1965E+004		5.6507E+004
	756.86	4.50	2.9012E+005		4.8756E+004
	815.55	0.50	2.7484E+006		1.2402E+006
	845.39	0.58	2.5103E+006		5.7121E+005
	850.64	0.23	6.1499E+006		3.8518E+006
	873.20	12.09	1.2828E+005		7.7591E+004
	892.73	0.50	2.7057E+006		1.3371E+005
	904.05	0.85	1.8685E+006		-5.1499E+005
	996.30	10.34	1.2541E+005		-3.4674E+003
	1004.76	17.90	7.2858E+004		3.6525E+004
	1128.40	0.29	5.8679E+006		6.0605E+005



Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
EU-154	1140.90	0.22	7.5113E+006	4.12E+004	5.4576E+006
	1241.60	0.13	1.5457E+007		1.3877E+006
	1246.60	0.80	2.2091E+006		-2.1730E+006
	1274.51	34.40	4.5205E+004		6.4460E+003
	1494.08	0.71	1.6582E+006		1.2467E+005
	1596.45	1.80	6.5891E+005		-1.0629E+006
HG-203	279.19	77.30	1.5643E+004	1.56E+004	2.9854E+003
BI-214	609.31	46.30	3.5374E+004	3.54E+004	4.5565E+004
	768.36	5.04	2.4943E+005		-1.2490E+005
	806.17	1.23	1.1819E+006		1.0536E+005
	934.06	3.21	4.0594E+005		5.1178E+004
	1120.29	15.10	9.9071E+004		-7.0873E+004
	1155.19	1.69	9.6898E+005		2.4038E+005
	1238.11	5.94	3.4009E+005		2.1854E+005
	1280.96	1.47	1.0436E+006		-3.5612E+005
	1377.67	4.11	2.5826E+005		-6.3011E+004
	1385.31	0.78	1.2441E+006		-9.2869E+005
	1401.50	1.39	9.1917E+005		-9.2097E+005
	1407.98	2.48	5.1700E+005		1.8085E+005
	1509.19	2.19	5.1883E+005		2.9784E+005
	1661.28	1.15	5.6675E+005		-3.0516E+005
	1729.60	3.05	3.7652E+005		-1.2607E+005
	1764.49	15.80	9.9155E+004		7.4423E+004
	1847.44	2.12	5.3913E+005		2.5132E+005
	2118.54	1.21	0.0000E+000		0.0000E+000
	74.81	6.33	5.1633E+005	3.50E+004	5.0928E+005
	77.11	10.70	2.7806E+005		2.9044E+005
	87.20	3.70	6.2155E+005		7.7604E+004
	89.80	1.03	2.1116E+006		-1.0871E+006
	241.98	7.49	1.9441E+005		6.2985E+004
	295.21	19.20	6.5747E+004		3.9950E+004
	351.92	37.20	3.5042E+004		2.4364E+004
	785.91	1.10	1.1607E+006		-1.2903E+006

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or has not been calculated

@ = Half-life too short to be able to perform the decay correction

\*\*\*\*\*  
 \*\*\* G A M M A S P E C T R U M A N A L Y I S \*\*\*  
 \*\*\*\*\*

Filename: 3844

Report Generated On : 9/16/2017 12:37:48 PM

Sample Title : WGTV-19 09/16/2017 ✓  
 Sample Description :  
 Sample Identification :  
 Sample Type :  
 Sample Geometry : 3m-90d ✓

Peak Locate Threshold : 3.00  
 Peak Locate Range (in channels) : 1 - 65535  
 Peak Area Range (in channels) : 200 - 8000  
 Identification Energy Tolerance : 1.000 keV

Sample Size : 2.830E+001 m2 ✓

Sample Taken On : 9/16/2017 12:26:00 PM  
 Acquisition Started : 9/16/2017 12:27:47 PM

Live Time : 600.0 seconds ✓  
 Real Time : 600.2 seconds

Dead Time : 0.04 % ✓

Energy Calibration Used Done On : 10/12/2016  
 Efficiency Calibration Used Done On : 12/16/2016  
 Efficiency ID : ULAR\_\_PLANE\_90D\_

REMOVED  
 J. A. J.  
 10/2/17

peak analysis results available for reporting purposes

\*\*\*\*\*  
 \*\*\* N U C L I D E I D E N T I F I C A T I O N R E P O R T \*\*\*  
 \*\*\*\*\*

Sample Title: WGTV-19 09/16/2017  
 Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/m2 )	Activity Uncertainty
-----------------	------------------	-----------------	--------------	-----------------------	-------------------------

\* = Energy line found in the spectrum.  
 @ = Energy line not used for Weighted Mean Activity  
 Energy Tolerance : 1.000 keV  
 Nuclide confidence index threshold = 0.30  
 Errors quoted at 1.960 sigma

\*\*\*\*\*  
 \*\*\* I N T E R F E R E N C E C O R R E C T E D R E P O R T \*\*\*  
 \*\*\*\*\*

	Nuclide	Wt mean	Wt mean
Nuclide	Id	Activity	Activity
Name	Confidence	(pCi/m2 )	Uncertainty

? = Nuclide is part of an undetermined solution  
 X = Nuclide rejected by the interference analysis  
 @ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

peak search results available for nuclide analysis.

\*\*\*\*\*  
\*\*\* N U C L I D E M D A R E P O R T \*\*\*\*\*  
\*\*\*\*\*

Detector Name: 3844  
Sample Geometry:  
Sample Title: WGTV-19 09/16/2017  
Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
K-40	1460.81	10.67	4.4685E+005	4.47E+005	1.3968E+006
SC-46	889.25	99.98	1.3175E+004	1.32E+004	-2.8370E+003
	1120.51	99.99	1.8900E+004		8.9469E+003
CO-57	122.06	85.51	2.0008E+004	2.00E+004	2.8904E+003
	136.48	10.60	1.3703E+005		2.3637E+003
CO-60	1173.22	100.00	1.5886E+004	1.24E+004	1.9840E+003
	1332.49	100.00	1.2351E+004		4.4694E+002
SE-75	96.73	3.41	5.7054E+005	2.18E+004	-1.1748E+005
	121.11	16.70	1.0370E+005		2.0989E+004
	136.00	59.20	2.4357E+004		-1.2198E+004
	198.60	1.45	9.3327E+005		4.4636E+005
	264.65	59.80	2.1822E+004		-2.4545E+004
	279.53	25.20	4.7399E+004		-1.7597E+004
	303.91	1.32	8.9500E+005		-3.3481E+005
	400.65	11.40	1.0998E+005		-4.0031E+003
KR-85	513.99	0.43	3.6874E+006	3.69E+006	9.7594E+005
KR-85M	151.18	75.30	1.8899E+004	1.89E+004	1.2126E+004
	304.87	14.00	8.5752E+004		7.1271E+004
SR-85	513.99	99.27	1.5973E+004	1.60E+004	4.2276E+003
Y-88	898.02	93.40	1.3580E+004	7.08E+003	-4.9845E+003
	1836.01	99.38	7.0787E+003		1.9058E+002
CD-109	88.03	3.72	6.2415E+005	6.24E+005	1.8579E+005
SN-113	255.12	1.93	6.4200E+005	1.80E+004	-2.9870E+005
	391.69	64.90	1.8046E+004		-2.4597E+003
CS-134	475.35	1.46	9.1229E+005	1.45E+004	-3.7983E+005
	563.23	8.38	1.3932E+005		-7.6775E+003
	569.32	15.43	7.8358E+004		1.5128E+004
	604.70	97.60	1.5885E+004		6.4765E+003
	795.84	85.40	1.4495E+004		6.6778E+003
	801.93	8.73	1.6425E+005		3.2687E+004
	1038.57	1.00	1.3561E+006		-3.3258E+005
	1167.94	1.80	8.7990E+005		1.3641E+005
	1365.15	3.04	4.5796E+005		2.3802E+005
CS-136	66.91	12.50	3.2144E+005	1.27E+004	-3.1210E+004
	86.29	6.30	3.7997E+005		-3.4398E+005
	153.22	7.46	1.8363E+005		-9.9716E+004
	163.89	4.61	2.9816E+005		-2.4578E+004
	176.55	13.56	1.0200E+005		-3.9589E+003
	273.65	12.66	1.0060E+005		4.4644E+003
	340.57	48.50	2.6157E+004		1.7793E+004

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
CS-136	818.50	99.70	1.2660E+004	1.27E+004	1.9746E+003
	1048.07	79.60	1.8512E+004		3.5078E+003
	1235.34	19.70	7.7325E+004		-1.9762E+004
CS-137	661.65	85.12	3.0438E+004	3.04E+004	7.5583E+004
CS-138	138.10	1.49	1.1079E+006	1.72E+004	-9.2523E+004
	227.76	1.51	9.9669E+005		-6.9179E+005
	408.98	4.66	3.0282E+005		2.3489E+005
	462.79	30.70	4.9168E+004		3.3813E+004
	546.94	10.80	1.3018E+005		3.4939E+004
	871.80	5.11	2.8101E+005		-1.5436E+005
	1009.78	29.80	5.0733E+004		-1.7386E+004
	1147.22	1.24	1.6143E+006		-8.4587E+005
	1343.59	1.14	1.3632E+006		-7.0854E+005
	1435.86	76.30	1.7247E+004		-8.6660E+003
CE-139	165.85	80.35	1.6796E+004	1.68E+004	-7.1217E+003
EU-152	121.78	28.40	5.9609E+004	4.97E+004	-2.0520E+004
	244.69	7.49	1.6649E+005		-4.2217E+004
	344.27	26.50	4.9669E+004		-2.6752E+004
	411.11	2.21	5.4575E+005		2.9708E+005
	443.98	3.11	4.4883E+005		-2.7340E+004
	778.89	12.74	1.0085E+005		6.0656E+004
	867.32	4.16	2.9771E+005		-1.7768E+005
	964.01	14.40	1.0455E+005		-1.9043E+004
	1085.78	10.00	1.4427E+005		5.5956E+004
	1112.02	13.30	1.3466E+005		-1.5771E+004
EU-154	1407.95	20.70	6.1939E+004	4.20E+004	7.9692E+002
	123.07	40.40	4.2015E+004		2.0768E+004
	188.25	0.23	5.9256E+006		1.9259E+006
	247.93	6.83	1.7860E+005		2.4483E+004
	401.30	0.19	6.5356E+006		1.8850E+006
	444.39	0.55	2.5044E+006		-1.9934E+006
	478.26	0.21	6.4415E+006		3.6353E+006
	557.56	0.25	4.5464E+006		-1.4736E+006
	582.00	0.89	1.7177E+006		-4.2894E+005
	591.76	4.91	2.9048E+005		8.6963E+004
	625.22	0.32	3.5134E+006		-3.4965E+006
	676.59	0.14	8.5747E+006		-7.7355E+006
	692.42	1.78	6.4063E+005		-5.1532E+005
	715.76	0.17	7.7215E+006		1.8558E+006
	722.30	20.00	7.0696E+004		2.8036E+004
	756.86	4.50	2.7296E+005		5.1400E+004
	815.55	0.50	2.5858E+006		-3.4824E+004
	845.39	0.58	2.2549E+006		6.4239E+005
	850.64	0.23	5.3134E+006		2.0228E+006
	873.20	12.09	9.9653E+004		-3.0342E+004
	892.73	0.50	2.7057E+006		6.1214E+005
	904.05	0.85	1.6743E+006		-1.1420E+006
	996.30	10.34	1.4345E+005		-5.0295E+004
	1004.76	17.90	7.5327E+004		-4.5533E+004
	1128.40	0.29	5.2249E+006		-3.7142E+006



Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
EU-154	1140.90	0.22	7.0180E+006	4.20E+004	-8.0114E+005
	1241.60	0.13	1.2718E+007		1.3534E+007
	1246.60	0.80	1.8830E+006		-5.5215E+005
	1274.51	34.40	5.2142E+004		3.8256E+004
	1494.08	0.71	1.2894E+006		-1.6761E+005
	1596.45	1.80	7.8399E+005		-9.4566E+003
	279.19	77.30	1.5392E+004	1.54E+004	-9.1544E+003
HG-203 BI-214	609.31	46.30	3.8724E+004	3.87E+004	5.2030E+004
	768.36	5.04	2.4943E+005		-5.7187E+004
	806.17	1.23	1.2395E+006		-2.5871E+004
	934.06	3.21	4.4777E+005		-5.4834E+004
	1120.29	15.10	1.2513E+005		5.9235E+004
	1155.19	1.69	1.1199E+006		4.4087E+005
	1238.11	5.94	2.7724E+005		1.0253E+005
	1280.96	1.47	1.2091E+006		2.9613E+005
	1377.67	4.11	3.4862E+005		8.5251E+004
	1385.31	0.78	1.8025E+006		-1.2350E+006
	1401.50	1.39	1.0194E+006		-1.5872E+005
	1407.98	2.48	5.1700E+005		6.6518E+003
	1509.19	2.19	6.3492E+005		5.2123E+004
	1661.28	1.15	8.0014E+005		3.0516E+005
	1729.60	3.05	4.3043E+005		5.2317E+004
	1764.49	15.80	1.0937E+005		5.5352E+004
	1847.44	2.12	5.9830E+005		6.3828E+004
	2118.54	1.21	0.0000E+000		0.0000E+000
	74.81	6.33	5.0872E+005	3.87E+004	5.1939E+004
	77.11	10.70	2.7621E+005		3.1925E+004
	87.20	3.70	6.3932E+005		1.0307E+003
	89.80	1.03	2.1663E+006		-1.0640E+006
	241.98	7.49	1.7216E+005		1.3923E+004
	295.21	19.20	6.6356E+004		1.7481E+004
	351.92	37.20	3.8652E+004		5.0645E+004
	785.91	1.10	1.0845E+006		-1.6607E+006

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or has not been calculated

@ = Half-life too short to be able to perform the decay correction

\*\*\*\*\*  
 \*\*\* G A M M A P E C T R U M A N A L Y I S \*\*\*  
 \*\*\*\*\*

Filename: 3844

Report Generated On : 9/18/2017 9:34:26 AM

Sample Title : WGTV 18 ✓  
 Sample Description :  
 Sample Identification :  
 Sample Type :  
 Sample Geometry : 3m\_90d ✓

Peak Locate Threshold : 3.00  
 Peak Locate Range (in channels) : 1 - 65535  
 Peak Area Range (in channels) : 200 - 8000  
 Identification Energy Tolerance : 1.000 keV

Sample Size : 2.830E+001 m2 ✓

Sample Taken On : 9/18/2017 9:24:00 AM  
 Acquisition Started : 9/18/2017 9:24:25 AM

Live Time : 600.0 seconds ✓  
 Real Time : 600.2 seconds

Dead Time : 0.03 % ✓

Energy Calibration Used Done On : 10/12/2016  
 Efficiency Calibration Used Done On : 12/16/2016  
 Efficiency ID : ULAR\_\_PLANE\_90D\_

*REVIEWED*  
*Joe [Signature]*  
*10/2/17*

peak analysis results available for reporting purposes

\*\*\*\*\*  
\*\*\* N U C L I D E I D E N T I F I C A T I O N R E P O R T \*\*\*  
\*\*\*\*\*

Sample Title: WGTV 18  
Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/m2 )	Activity Uncertainty
-----------------	------------------	-----------------	--------------	-----------------------	-------------------------

\* = Energy line found in the spectrum.  
@ = Energy line not used for Weighted Mean Activity  
Energy Tolerance : 1.000 keV  
Nuclide confidence index threshold = 0.30  
Errors quoted at 1.960 sigma

\*\*\*\*\*  
 \*\*\* I N T E R F E R E N C E C O R R E C T E D R E P O R T \*\*\*  
 \*\*\*\*\*

	Nuclide	Wt mean	Wt mean
Nuclide	Id	Activity	Activity
Name	Confidence	(pCi/m2 )	Uncertainty

? = Nuclide is part of an undetermined solution  
 X = Nuclide rejected by the interference analysis  
 @ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

peak search results available for nuclide analysis.

\*\*\*\*\*  
\*\*\* N U C L I D E M D A R E P O R T \*\*\*\*\*  
\*\*\*\*\*

Detector Name: 3844  
Sample Geometry: 3m 90d  
Sample Title: WGTV 18  
Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
K-40	1460.81	10.67	4.2766E+005	4.28E+005	1.2423E+006
SC-46	889.25	99.98	1.4418E+004	1.44E+004	-5.4470E+003
	1120.51	99.99	1.9416E+004		-1.0616E+003
CO-57	122.06	85.51	2.0211E+004	2.02E+004	9.8186E+003
	136.48	10.60	1.4169E+005		-9.6033E+002
CO-60	1173.22	100.00	1.7586E+004	1.37E+004	1.0501E+004
	1332.49	100.00	1.3698E+004		-1.4114E+003
SE-75	96.73	3.41	5.7442E+005	1.99E+004	2.8708E+004
	121.11	16.70	1.0207E+005		-2.0668E+004
	136.00	59.20	2.5338E+004		1.2499E+002
	198.60	1.45	8.9006E+005		-2.9920E+005
	264.65	59.80	1.9947E+004		-4.5586E+003
	279.53	25.20	4.6932E+004		4.8041E+004
	303.91	1.32	9.1457E+005		4.6693E+004
	400.65	11.40	1.1159E+005		6.2626E+004
KR-85	513.99	0.43	3.7988E+006	3.80E+006	1.8020E+006
KR-85M	151.18	75.30	1.8419E+004	1.84E+004	2.0878E+003
	304.87	14.00	8.6082E+004		-3.7511E+004
SR-85	513.99	99.27	1.6455E+004	1.65E+004	7.8059E+003
Y-88	898.02	93.40	1.5354E+004	1.08E+004	-9.8800E+002
	1836.01	99.38	1.0751E+004		-1.2387E+003
CD-109	88.03	3.72	6.2614E+005	6.26E+005	5.7742E+005
SN-113	255.12	1.93	6.2598E+005	1.67E+004	2.9474E+005
	391.69	64.90	1.6710E+004		1.0434E+004
CS-134	475.35	1.46	8.8637E+005	1.57E+004	4.6307E+005
	563.23	8.38	1.5064E+005		5.2060E+004
	569.32	15.43	8.3736E+004		-1.6209E+004
	604.70	97.60	1.5700E+004		2.5540E+003
	795.84	85.40	1.6181E+004		-4.8365E+002
	801.93	8.73	1.6425E+005		4.5116E+004
	1038.57	1.00	1.4643E+006		5.4388E+004
	1167.94	1.80	9.6286E+005		-1.3187E+006
	1365.15	3.04	4.1292E+005		2.9884E+005
CS-136	66.91	12.50	3.0519E+005	1.44E+004	-3.8082E+005
	86.29	6.30	3.8196E+005		2.5779E+005
	153.22	7.46	1.8278E+005		-4.8140E+004
	163.89	4.61	2.8683E+005		-3.1280E+003
	176.55	13.56	9.4451E+004		-1.1995E+004
	273.65	12.66	9.2664E+004		-1.8413E+004
	340.57	48.50	2.5149E+004		1.8236E+004

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
CS-136	818.50	99.70	1.4438E+004	1.44E+004	7.9568E+003
	1048.07	79.60	1.9028E+004		1.5287E+003
	1235.34	19.70	1.0241E+005		1.0122E+005
CS-137	661.65	85.12	2.0056E+004	2.01E+004	1.9709E+004
CS-138	138.10	1.49	1.1390E+006	1.46E+004	1.7829E+005
	227.76	1.51	9.1350E+005		8.4549E+004
	408.98	4.66	2.9403E+005		-1.2516E+005
	462.79	30.70	4.5829E+004		3.9549E+004
	546.94	10.80	1.2535E+005		2.2201E+003
	871.80	5.11	2.7286E+005		5.2277E+004
	1009.78	29.80	5.0103E+004		-2.2158E+004
	1147.22	1.24	1.3542E+006		-1.0231E+006
	1343.59	1.14	1.1488E+006		-1.1930E+006
	1435.86	76.30	1.4649E+004		-5.7705E+003
CE-139	165.85	80.35	1.6577E+004	1.66E+004	4.5445E+002
EU-152	121.78	28.40	6.0160E+004	4.50E+004	-2.8109E+004
	244.69	7.49	1.7197E+005		4.5396E+003
	344.27	26.50	4.5030E+004		-2.5869E+004
	411.11	2.21	5.6064E+005		1.6003E+005
	443.98	3.11	4.0309E+005		1.0009E+005
	778.89	12.74	9.8332E+004		-5.1089E+004
	867.32	4.16	3.0230E+005		-3.6192E+005
	964.01	14.40	1.2906E+005		9.5347E+004
	1085.78	10.00	1.5296E+005		4.1535E+004
	1112.02	13.30	1.2158E+005		-1.7822E+005
	1407.95	20.70	6.8696E+004		5.6781E+004
EU-154	123.07	40.40	4.2493E+004	4.25E+004	2.9160E+004
	188.25	0.23	5.4582E+006		-5.6833E+006
	247.93	6.83	1.7614E+005		-1.6145E+004
	401.30	0.19	6.5356E+006		4.1734E+006
	444.39	0.55	2.2677E+006		1.1987E+006
	478.26	0.21	6.4061E+006		-3.6078E+006
	557.56	0.25	4.9156E+006		1.6310E+006
	582.00	0.89	1.6788E+006		1.3257E+006
	591.76	4.91	3.0001E+005		1.5194E+005
	625.22	0.32	3.5134E+006		-1.6540E+006
	676.59	0.14	9.0868E+006		-1.2773E+006
	692.42	1.78	7.5025E+005		-3.5596E+005
	715.76	0.17	7.5583E+006		-1.1583E+006
	722.30	20.00	7.3825E+004		4.9317E+004
	756.86	4.50	3.2444E+005		1.7115E+005
	815.55	0.50	2.7484E+006		-1.4717E+006
	845.39	0.58	2.1936E+006		7.0261E+004
	850.64	0.23	6.1499E+006		3.6125E+005
	873.20	12.09	1.0606E+005		-2.2661E+004
	892.73	0.50	2.8150E+006		-7.7498E+005
	904.05	0.85	1.6743E+006		-1.8826E+005
	996.30	10.34	1.4713E+005		2.3884E+004
	1004.76	17.90	7.4104E+004		-4.7526E+004
	1128.40	0.29	6.3192E+006		-1.3230E+006



Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
EU-154	1140.90	0.22	7.4155E+006	4.25E+004	-1.5330E+006
	1241.60	0.13	1.4496E+007		-1.1594E+007
	1246.60	0.80	2.1539E+006		-1.3012E+006
	1274.51	34.40	5.0171E+004		3.3211E+004
	1494.08	0.71	1.6582E+006		-2.9713E+005
	1596.45	1.80	7.1203E+005		3.2310E+004
HG-203	279.19	77.30	1.5085E+004	1.51E+004	7.5415E+002
BI-214	609.31	46.30	3.5374E+004	3.54E+004	2.3077E+004
	768.36	5.04	2.7627E+005		6.7199E+004
	806.17	1.23	1.1819E+006		7.0713E+005
	934.06	3.21	4.8048E+005		1.4335E+005
	1120.29	15.10	1.2855E+005		-7.0287E+003
	1155.19	1.69	1.0180E+006		1.6868E+005
	1238.11	5.94	3.3374E+005		1.0835E+005
	1280.96	1.47	1.1131E+006		2.8231E+005
	1377.67	4.11	3.4081E+005		1.8767E+005
	1385.31	0.78	1.7600E+006		5.3146E+005
	1401.50	1.39	9.9545E+005		5.2910E+005
	1407.98	2.48	5.7339E+005		4.7394E+005
	1509.19	2.19	4.4725E+005		-1.0637E+004
	1661.28	1.15	9.6835E+005		8.5828E+004
	1729.60	3.05	4.4671E+005		8.6026E+004
	1764.49	15.80	7.3799E+004		-3.3723E+004
	1847.44	2.12	3.8649E+005		-8.9758E+004
	2118.54	1.21	0.0000E+000		0.0000E+000
	74.81	6.33	5.1691E+005	3.74E+004	7.2344E+005
	77.11	10.70	2.5989E+005		-2.1306E+005
	87.20	3.70	6.3458E+005		-1.1271E+005
	89.80	1.03	2.1569E+006		3.4477E+005
	241.98	7.49	1.8364E+005		6.5957E+004
	295.21	19.20	6.9892E+004		7.7718E+004
	351.92	37.20	3.7448E+004		3.3541E+004
	785.91	1.10	1.2318E+006		2.5747E+005

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or has not been calculated

@ = Half-life too short to be able to perform the decay correction

Filename: 3844

Report Generated On : 9/18/2017 8:52:29 AM

Sample Title : WGTV 17 ✓  
 Sample Description :  
 Sample Identification :  
 Sample Type :  
 Sample Geometry : 3m\_90d ✓

Peak Locate Threshold : 3.00  
 Peak Locate Range (in channels) : 1 - 65535  
 Peak Area Range (in channels) : 200 - 8000  
 Identification Energy Tolerance : 1.000 keV

Sample Size : 2.830E+001 m2

Sample Taken On : 9/18/2017 8:42:00 AM  
 Acquisition Started : 9/18/2017 8:42:28 AM ✓

Live Time : 600.0 seconds ✓  
 Real Time : 600.2 seconds

Dead Time : 0.04 % ✓

Energy Calibration Used Done On : 10/12/2016  
 Efficiency Calibration Used Done On : 12/16/2016  
 Efficiency ID : ULAR\_\_PLANE\_90D\_

*REVIEWED*  
*Jim O'Neil*  
*10/2/17*

\*\*\*\*\*  
\*\*\* P E A K A N A L Y S I S R E P O R T \*\*\*  
\*\*\*\*\*

Detector Name: 3844

Sample Title: WGTV 17

Peak Analysis Performed on: 9/18/2017 8:52:29 AM

Peak Analysis From Channel: 200

Peak Analysis To Channel: 8000

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	5821-	5852	5836.25	1458.80	1.54	2.26E+002	31.97	8.00E+000

= First peak in a multiplet region

= Other peak in a multiplet region

= Fitted singlet

Errors quoted at 1.960 sigma

\*\*\*\*\*  
 \*\*\* N U C L I D E I D E N T I F I C A T I O N R E P O R T \*\*\*  
 \*\*\*\*\*

Sample Title: WGTV 17  
 Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/m2 )	Activity Uncertainty
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\* = Energy line found in the spectrum.  
 @ = Energy line not used for Weighted Mean Activity  
 Energy Tolerance : 1.000 keV  
 Nuclide confidence index threshold = 0.30  
 Errors quoted at 1.960 sigma

\*\*\*\*\*  
 \*\*\* I N T E R F E R E N C E C O R R E C T E D R E P O R T \*\*\*  
 \*\*\*\*\*

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/m2 )	Wt mean Activity Uncertainty
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? = Nuclide is part of an undetermined solution  
 X = Nuclide rejected by the interference analysis  
 @ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

\*\*\*\*\* U N I D E N T I F I E D P E A K S \*\*\*\*\*

Peak Locate Performed on: 9/18/2017 8:52:29 AM  
 Peak Locate From Channel: 200  
 Peak Locate To Channel: 8000

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	1458.80	3.7667E-001	14.15		Ac <sup>228</sup>

M = First peak in a multiplet region  
 m = Other peak in a multiplet region  
 F = Fitted singlet

Errors quoted at 1.960 sigma

\*\*\*\*\*  
\*\*\* N U C L I D E M D A R E P O R T \*\*\*\*\*  
\*\*\*\*\*

Detector Name: 3844  
Sample Geometry: 3m 90d  
Sample Title: WGTV 17  
Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
K-40	1460.81	10.67	4.4863E+005	4.49E+005	1.3969E+006
SC-46	889.25	99.98	1.4075E+004	1.41E+004	5.5911E+003
	1120.51	99.99	1.8900E+004		1.8838E+004
CO-57	122.06	85.51	2.0322E+004	2.03E+004	5.4923E+003
	136.48	10.60	1.3996E+005		3.3352E+004
CO-60	1173.22	100.00	1.6971E+004	1.27E+004	6.3975E+002
	1332.49	100.00	1.2703E+004		4.4508E+003
SE-75	96.73	3.41	5.7313E+005	1.96E+004	-1.3449E+005
	121.11	16.70	1.0404E+005		6.9823E+003
	136.00	59.20	2.5304E+004		1.2237E+003
	198.60	1.45	8.9684E+005		5.6283E+005
	264.65	59.80	1.9575E+004		-2.4409E+003
	279.53	25.20	4.7708E+004		-6.0057E+003
	303.91	1.32	8.9169E+005		4.0278E+003
	400.65	11.40	1.0152E+005		1.6412E+004
KR-85	513.99	0.43	3.5556E+006	3.56E+006	-7.1640E+005
KR-85M	151.18	75.30	1.8943E+004	1.89E+004	1.1655E+004
	304.87	14.00	8.3856E+004		-5.0748E+003
SR-85	513.99	99.27	1.5402E+004	1.54E+004	-3.1033E+003
Y-88	898.02	93.40	1.4789E+004	9.16E+003	-4.7345E+003
	1836.01	99.38	9.1564E+003		-2.4298E+003
CD-109	88.03	3.72	6.4566E+005	6.46E+005	2.1967E+005
SN-113	255.12	1.93	6.1505E+005	1.62E+004	-1.5074E+005
	391.69	64.90	1.6164E+004		-2.3937E+004
CS-134	475.35	1.46	8.4865E+005	1.52E+004	1.8671E+005
	563.23	8.38	1.5770E+005		1.4502E+005
	569.32	15.43	8.9977E+004		5.0926E+004
	604.70	97.60	1.5226E+004		2.9999E+003
	795.84	85.40	1.6181E+004		-1.0980E+004
	801.93	8.73	1.7242E+005		5.4042E+004
	1038.57	1.00	1.5642E+006		5.2969E+005
	1167.94	1.80	9.6286E+005		-9.7355E+004
	1365.15	3.04	4.1292E+005		-1.5772E+005
CS-136	66.91	12.50	3.3146E+005	1.41E+004	-3.1307E+005
	86.29	6.30	3.9070E+005		2.2126E+005
	153.22	7.46	1.8501E+005		1.4211E+004
	163.89	4.61	2.8922E+005		-7.5083E+004
	176.55	13.56	9.6694E+004		-9.6309E+004
	273.65	12.66	9.6567E+004		4.6389E+004
	340.57	48.50	2.7219E+004		-7.9754E+003

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
CS-136	818.50	99.70	1.4133E+004	1.41E+004	4.7004E+003
	1048.07	79.60	1.9775E+004		9.8162E+003
	1235.34	19.70	8.8079E+004		-5.3611E+004
CS-137	661.65	85.12	2.1111E+004	2.11E+004	2.1711E+004
CS-138	138.10	1.49	1.0784E+006	1.30E+004	-1.3952E+006
	227.76	1.51	8.5164E+005		-9.6732E+004
	408.98	4.66	2.4022E+005		-3.1529E+005
	462.79	30.70	4.6150E+004		2.8886E+004
	546.94	10.80	1.3164E+005		1.2708E+005
	871.80	5.11	3.1611E+005		5.5213E+004
	1009.78	29.80	5.1790E+004		-9.8099E+002
	1147.22	1.24	1.4567E+006		-2.0786E+005
	1343.59	1.14	1.4478E+006		-3.8366E+005
	1435.86	76.30	1.3033E+004		-1.7366E+004
CE-139	165.85	80.35	1.6550E+004	1.65E+004	4.0211E+003
EU-152	121.78	28.40	6.0841E+004	5.12E+004	-1.0525E+003
	244.69	7.49	1.6904E+005		-2.5571E+005
	344.27	26.50	5.1232E+004		2.7413E+004
	411.11	2.21	4.5645E+005		-1.8313E+005
	443.98	3.11	4.0309E+005		1.3035E+005
	778.89	12.74	1.1365E+005		-3.2526E+003
	867.32	4.16	3.5998E+005		1.9839E+005
	964.01	14.40	1.1860E+005		-4.1003E+004
	1085.78	10.00	1.7806E+005		4.2309E+004
	1112.02	13.30	1.3328E+005		-4.3673E+004
	1407.95	20.70	6.3705E+004		4.7815E+004
EU-154	123.07	40.40	4.2493E+004	4.25E+004	1.5961E+003
	188.25	0.23	5.9158E+006		3.7812E+006
	247.93	6.83	1.8342E+005		-5.3614E+004
	401.30	0.19	5.9688E+006		3.6109E+005
	444.39	0.55	2.2677E+006		4.2201E+005
	478.26	0.21	6.1896E+006		8.5887E+005
	557.56	0.25	4.7554E+006		5.3343E+005
	582.00	0.89	1.8112E+006		2.5015E+006
	591.76	4.91	2.3905E+005		-1.5683E+005
	625.22	0.32	3.6781E+006		-5.5968E+005
	676.59	0.14	8.7834E+006		-6.5411E+005
	692.42	1.78	6.4063E+005		-6.5836E+005
	715.76	0.17	7.7215E+006		4.6657E+005
	722.30	20.00	7.5636E+004		4.4125E+004
	756.86	4.50	3.0624E+005		6.2300E+004
	815.55	0.50	2.7167E+006		-1.2583E+006
	845.39	0.58	2.7402E+006		5.5809E+005
	850.64	0.23	6.9394E+006		2.5470E+006
	873.20	12.09	1.2047E+005		6.0872E+004
	892.73	0.50	2.5914E+006		-8.8861E+005
	904.05	0.85	2.0262E+006		4.1872E+005
	996.30	10.34	1.5071E+005		6.4055E+004
	1004.76	17.90	7.8870E+004		-3.0856E+004
	1128.40	0.29	5.8003E+006		-6.7626E+006

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
EU-154	1140.90	0.22	8.1475E+006	4.25E+004	5.6744E+006
	1241.60	0.13	1.4496E+007		-3.7783E+006
	1246.60	0.80	2.2091E+006		-1.2824E+006
	1274.51	34.40	4.8112E+004		2.8166E+004
	1494.08	0.71	1.4506E+006		1.5714E+005
	1596.45	1.80	6.3035E+005		-3.3834E+005
HG-203	279.19	77.30	1.5442E+004	1.54E+004	-4.8267E+003
BI-214	609.31	46.30	3.3664E+004	3.37E+004	2.9708E+004
	768.36	5.04	2.7627E+005		-2.3038E+005
	806.17	1.23	1.2618E+006		1.3463E+006
	934.06	3.21	5.0100E+005		2.0726E+005
	1120.29	15.10	1.2513E+005		1.2473E+005
	1155.19	1.69	9.6898E+005		-2.0032E+005
	1238.11	5.94	2.9980E+005		-3.1042E+004
	1280.96	1.47	9.6852E+005		-5.3348E+005
	1377.67	4.11	3.2454E+005		-7.9146E+004
	1385.31	0.78	1.3659E+006		-2.5876E+006
	1401.50	1.39	9.4538E+005		-1.1863E+006
	1407.98	2.48	5.3174E+005		3.9911E+005
	1509.19	2.19	5.4022E+005		-1.5569E+005
	1661.28	1.15	6.5701E+005		1.8310E+005
	1729.60	3.05	3.5635E+005		1.6612E+005
	1764.49	15.80	9.9155E+004		7.4423E+004
	1847.44	2.12	4.7069E+005		1.7952E+005
	2118.54	1.21	0.0000E+000		0.0000E+000
> PB-214	74.81	6.33	5.3292E+005	3.59E+004	3.9625E+005
	77.11	10.70	2.7929E+005		2.2673E+005
	87.20	3.70	6.5265E+005		-2.4351E+005
	89.80	1.03	2.2356E+006		5.1326E+005
	241.98	7.49	1.8478E+005		1.3883E+005
	295.21	19.20	6.4511E+004		1.0618E+004
	351.92	37.20	3.5948E+004		-2.6417E+003
	785.91	1.10	1.2590E+006		-6.6287E+005

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or has not been calculated

@ = Half-life too short to be able to perform the decay correction



\*\*\*\*\*  
 \*\*\* G A M M A S E C T R U M A N A L Y S I S \*\*\*  
 \*\*\*\*\*

Filename: C:\GENIE2K\CAMFILES\9.16.17\WGTV-11 9.16.17.CNF

Report Generated On : 9/16/2017 2:11:35 PM

Sample Title : WGTV-11 09/16/2017 ✓

Sample Description :

Sample Identification :

Sample Type :

Sample Geometry : 3m\_90d ✓

Peak Locate Threshold : 3.00

Peak Locate Range (in channels) : 1 - 65535

Peak Area Range (in channels) : 200 - 8000

Identification Energy Tolerance : 1.000 keV

Sample Size : 2.830E+001 m2 ✓

Sample Taken On : 9/16/2017 11:19:00 AM

Acquisition Started : 9/16/2017 11:19:58 AM

Live Time : 600.0 seconds ✓

Dead Time : 600.2 seconds

Rad Time : 0.03 % ✓

Energy Calibration Used Done On : 10/12/2016

Efficiency Calibration Used Done On : 12/16/2016

Efficiency ID : ULAR\_\_PLANE\_90D\_

REVIEWED  
 Joe D. Gub  
 10/24/17

\*\*\*\*\*  
\*\*\* P E A K A N A L Y S I S R E P O R T \*\*\*\*\*  
\*\*\*\*\*

Detector Name: 3844

Sample Title: WGTV-11 09/16/2017

Peak Analysis Performed on: 9/16/2017 2:11:35 PM

Peak Analysis From Channel: 200

Peak Analysis To Channel: 8000

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	5829-	5855	5845.04	1460.99	0.42	1.84E+002	36.49	3.71E+001

= First peak in a multiplet region

= Other peak in a multiplet region

= Fitted singlet

Errors quoted at 1.960 sigma

\*\*\*\*\*  
 \*\*\* N U C L I D E I D E N T I F I C A T I O N R E P O R T \*\*\*  
 \*\*\*\*\*

Sample Title: WGTV-11 09/16/2017  
 Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/m2 )	Activity Uncertainty
K-40	0.995	1460.81*	10.67	1.09669E+006	2.35041E+005

\* = Energy line found in the spectrum.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.960 sigma

\*\*\*\*\*  
 \*\*\*    I N T E R F E R E N C E    C O R R E C T E D    R E P O R T    \*\*\*\*\*  
 \*\*\*\*\*

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/m2 )	Wt mean Activity Uncertainty
K-40	0.995	1.096693E+006	2.350412E+005

? = Nuclide is part of an undetermined solution

X = Nuclide rejected by the interference analysis

@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

\*\*\*\*\*    U N I D E N T I F I E D    P E A K S    \*\*\*\*\*

Peak Locate Performed on: 9/16/2017    2:11:35 PM  
 Peak Locate From Channel: 200  
 Peak Locate To Channel: 8000

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
-------------	-----------------	-----------------------------------	---------------------------	--------------	-----------------

All peaks were identified.

\*\*\*\*\*  
\*\*\* N U C L I D E M D A R E P O R T \*\*\*\*\*  
\*\*\*\*\*

Detector Name: 3844  
Sample Geometry:  
Sample Title: WGTV-11 09/16/2017  
Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
+	K-40	1460.81*	10.67	2.6644E+005	2.66E+005	1.0967E+006
	SC-46	889.25	99.98	1.4075E+004	1.41E+004	1.8555E+003
		1120.51	99.99	1.8547E+004		-7.9622E+002
	CO-57	122.06	85.51	1.9985E+004	2.00E+004	9.7966E+003
		136.48	10.60	1.3957E+005		1.9807E+004
	CO-60	1173.22	100.00	1.7984E+004	1.27E+004	-7.1866E+003
		1332.49	100.00	1.2703E+004		-3.0262E+003
	SE-75	96.73	3.41	5.6334E+005	2.08E+004	-3.5451E+005
		121.11	16.70	1.0242E+005		1.0285E+004
		136.00	59.20	2.4677E+004		-1.6839E+004
		198.60	1.45	8.4636E+005		-1.7250E+005
		264.65	59.80	2.0848E+004		-1.4640E+004
		279.53	25.20	4.4020E+004		-1.0801E+004
		303.91	1.32	8.3692E+005		-6.6682E+005
		400.65	11.40	9.9141E+004		2.3417E+004
	KR-85	513.99	0.43	3.5048E+006	3.50E+006	7.7132E+005
	KR-85M	151.18	75.30	1.7646E+004	1.76E+004	-1.9505E+004
		304.87	14.00	7.9974E+004		-3.5341E+004
	SR-85	513.99	99.27	1.5182E+004	1.52E+004	3.3412E+003
	Y-88	898.02	93.40	1.4199E+004	1.33E+004	-2.8128E+003
		1836.01	99.38	1.3279E+004		1.8295E+003
	CD-109	88.03	3.72	6.0392E+005	6.04E+005	2.0901E+005
	SN-113	255.12	1.93	6.1689E+005	1.76E+004	-1.4487E+005
		391.69	64.90	1.7646E+004		-1.2212E+004
	CS-134	475.35	1.46	9.1738E+005	1.70E+004	5.7836E+005
		563.23	8.38	1.4697E+005		4.3356E+004
		569.32	15.43	8.2427E+004		4.8272E+004
		604.70	97.60	1.6952E+004		1.2204E+004
		795.84	85.40	1.7040E+004		6.7056E+002
		801.93	8.73	1.7082E+005		-2.7177E+002
		1038.57	1.00	1.5051E+006		3.7019E+005
		1167.94	1.80	9.6286E+005		-2.8138E+005
		1365.15	3.04	4.0075E+005		2.7892E+005
	CS-136	66.91	12.50	3.1681E+005	1.53E+004	-1.3058E+005
		86.29	6.30	3.6174E+005		5.6397E+003
		153.22	7.46	1.7651E+005		4.5929E+003
		163.89	4.61	2.8971E+005		2.2138E+005
		176.55	13.56	9.9550E+004		1.8384E+004
		273.65	12.66	9.4788E+004		3.5722E+003
		340.57	48.50	2.6157E+004		2.0951E+004

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
CS-136	818.50	99.70	1.5314E+004	1.53E+004	-8.1204E+003
	1048.07	79.60	1.9281E+004		9.6393E+003
	1235.34	19.70	9.9532E+004		-4.4002E+004
CS-137	661.65	85.12	1.7495E+004	1.75E+004	1.8053E+004
CS-138	138.10	1.49	1.1141E+006	2.10E+004	-3.5358E+005
	227.76	1.51	9.4017E+005		2.1463E+005
	408.98	4.66	2.9596E+005		-5.8070E+004
	462.79	30.70	4.6096E+004		3.7904E+004
	546.94	10.80	1.3411E+005		3.7511E+004
	871.80	5.11	2.8039E+005		2.9839E+004
	1009.78	29.80	5.7021E+004		-1.1074E+004
	1147.22	1.24	1.4924E+006		-7.1931E+005
	1343.59	1.14	1.4339E+006		8.0492E+005
	1435.86	76.30	2.0972E+004		-1.5650E+004
CE-139	165.85	80.35	1.6272E+004	1.63E+004	-6.6432E+003
EU-152	121.78	28.40	5.9678E+004	4.34E+004	1.1042E+004
	244.69	7.49	1.7197E+005		-2.5237E+004
	344.27	26.50	4.3435E+004		-5.1307E+004
	411.11	2.21	5.5769E+005		-9.8565E+004
	443.98	3.11	3.9610E+005		-1.4608E+005
	778.89	12.74	1.1365E+005		1.7381E+004
	867.32	4.16	3.4458E+005		3.6534E+005
	964.01	14.40	1.2290E+005		-6.7543E+003
	1085.78	10.00	1.2748E+005		1.4469E+004
	1112.02	13.30	1.2158E+005		1.6791E+004
	1407.95	20.70	6.5417E+004		2.8566E+004
EU-154	123.07	40.40	4.0894E+004	4.09E+004	-2.7726E+004
	188.25	0.23	5.6663E+006		2.4795E+005
	247.93	6.83	1.7464E+005		-8.7370E+004
	401.30	0.19	5.8983E+006		1.5138E+006
	444.39	0.55	2.1736E+006		-3.0802E+006
	478.26	0.21	6.4766E+006		2.8584E+006
	557.56	0.25	4.6312E+006		-6.7664E+005
	582.00	0.89	1.9676E+006		2.9681E+006
	591.76	4.91	2.5297E+005		-6.1183E+004
	625.22	0.32	3.7181E+006		8.0047E+005
	676.59	0.14	1.0026E+007		4.2677E+006
	692.42	1.78	7.0555E+005		-1.1899E+005
	715.76	0.17	8.0372E+006		-5.8655E+006
	722.30	20.00	7.1333E+004		-5.4539E+004
	756.86	4.50	3.5254E+005		3.8403E+005
	815.55	0.50	3.1287E+006		4.4380E+004
	845.39	0.58	2.2549E+006		5.1680E+004
	850.64	0.23	6.0791E+006		5.1528E+004
	873.20	12.09	1.1060E+005		5.1571E+004
	892.73	0.50	2.7791E+006		-8.1945E+005
	904.05	0.85	1.9226E+006		-1.3904E+006
	996.30	10.34	1.2966E+005		-5.2532E+004
	1004.76	17.90	7.6528E+004		9.6480E+003
	1128.40	0.29	6.0006E+006		-2.3740E+006

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
EU-154	1140.90	0.22	7.4155E+006	4.09E+004	1.8397E+006
	1241.60	0.13	1.4824E+007		3.9716E+006
	1246.60	0.80	2.0970E+006		5.8291E+004
	1274.51	34.40	4.5951E+004		-9.4888E+003
	1494.08	0.71	1.1986E+006		-8.4568E+005
	1596.45	1.80	7.8399E+005		3.4296E+005
HG-203	279.19	77.30	1.4504E+004	1.45E+004	-6.7483E+003
BI-214	609.31	46.30	3.5742E+004	3.57E+004	3.5150E+004
	768.36	5.04	2.6173E+005		-7.3105E+004
	806.17	1.23	1.1819E+006		-3.9331E+005
	934.06	3.21	4.6986E+005		3.0542E+005
	1120.29	15.10	1.2280E+005		-5.2716E+003
	1155.19	1.69	9.9384E+005		-1.5636E+005
	1238.11	5.94	3.2726E+005		1.1311E+005
	1280.96	1.47	1.1297E+006		-2.0283E+005
	1377.67	4.11	3.3279E+005		5.5598E+004
	1385.31	0.78	1.6252E+006		7.0179E+005
	1401.50	1.39	8.9207E+005		3.2707E+005
	1407.98	2.48	5.4603E+005		2.3844E+005
	1509.19	2.19	5.4022E+005		1.3606E+005
	1661.28	1.15	9.1647E+005		4.2723E+005
	1729.60	3.05	4.1338E+005		2.3731E+005
	1764.49	15.80	7.3799E+004		-7.5295E+004
	1847.44	2.12	6.2541E+005		3.5903E+005
	2118.54	1.21	0.0000E+000		0.0000E+000
> PB-214	74.81	6.33	5.0872E+005	3.53E+004	6.5628E+005
	77.11	10.70	2.6961E+005		2.1079E+005
	87.20	3.70	6.0823E+005		-2.9366E+005
	89.80	1.03	2.1545E+006		5.7254E+005
	241.98	7.49	1.7700E+005		8.2262E+004
	295.21	19.20	6.2395E+004		-1.1894E+004
	351.92	37.20	3.5304E+004		4.2897E+004
	785.91	1.10	1.2590E+006		1.8004E+005

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or has not been calculated

@ = Half-life too short to be able to perform the decay correction

Filename: C:\GENIE2K\CAMFILES\9.16.17\WGTV-10-QC 9.16.17.CNF

Report Generated On : 9/16/2017 2:10:28 PM  
 Sample Title : WGTV-10-QC 09/16/2017 ✓  
 Sample Description :  
 Sample Identification :  
 Sample Type :  
 Sample Geometry : 3 m - 90d ✓  
 Peak Locate Threshold : 3.00  
 Peak Locate Range (in channels) : 1 - 65535  
 Peak Area Range (in channels) : 200 - 8000  
 Identification Energy Tolerance : 1.000 keV  
 Sample Size : 2.830E+001 m2 ✓  
 Sample Taken On : 9/16/2017 10:51:00 AM  
 Acquisition Started : 9/16/2017 10:52:02 AM ✓  
 Live Time : 600.0 seconds ✓  
 Real Time : 600.2 seconds  
 Dead Time : 0.03 % ✓

Energy Calibration Used Done On : 10/12/2016  
 Efficiency Calibration Used Done On : 12/16/2016  
 Efficiency ID : ULAR\_\_PLANE\_90D\_

REVIEWED  
 Joe O'Jahn  
 10/2/17



\*\*\*\*\*  
\*\*\* P E A K A N A L Y S I S R E P O R T \*\*\*  
\*\*\*\*\*

Detector Name: 3844

Sample Title: WGTV-10-QC 09/16/2017

Peak Analysis Performed on: 9/16/2017 2:10:28 PM

Peak Analysis From Channel: 200

Peak Analysis To Channel: 8000

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	2472-	2483	2477.73	619.59	0.41	1.53E+001	10.30	4.70E+000
2	5841-	5858	5847.72	1461.66	0.30	6.91E+001	37.61	8.09E+001

= First peak in a multiplet region

= Other peak in a multiplet region

= Fitted singlet

Errors quoted at 1.960 sigma

\*\*\*\*\*  
 \*\*\* N U C L I D E I D E N T I F I C A T I O N R E P O R T \*\*\*  
 \*\*\*\*\*

Sample Title: WGTV-10-QC 09/16/2017  
 Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/m2 )	Activity Uncertainty
K-40	0.891	1460.81*	10.67	4.12231E+005	2.26841E+005
BR-82	0.994	221.45	2.26		
		554.32	70.60		
		606.30	1.17		
		619.07*	43.10	1.25814E+004	8.53007E+003
		698.33	28.20		
		776.49	83.31		
		827.81	24.20		
		1007.57	1.27		
		1043.97	27.30		
		1317.47	26.90		
		1474.82	16.58		

\* = Energy line found in the spectrum.  
 @ = Energy line not used for Weighted Mean Activity  
 Energy Tolerance : 1.000 keV  
 Nuclide confidence index threshold = 0.30  
 Errors quoted at 1.960 sigma

May SE  
 Bi 206  
 as well  
 Jan D Jones  
 1/2/17

\*\*\*\*\*  
 \*\*\* I N T E R F E R E N C E C O R R E C T E D R E P O R T \*\*\*  
 \*\*\*\*\*

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/m2 )	Wt mean Activity Uncertainty
K-40	0.891	4.122308E+005	2.268407E+005
BR-82	0.994	1.258140E+004	8.530065E+003

? = Nuclide is part of an undetermined solution

X = Nuclide rejected by the interference analysis

@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

\*\*\*\*\* U N I D E N T I F I E D P E A K S \*\*\*\*\*

Peak Locate Performed on: 9/16/2017 2:10:28 PM  
 Peak Locate From Channel: 200  
 Peak Locate To Channel: 8000

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
-------------	-----------------	-----------------------------------	---------------------------	--------------	-----------------

All peaks were identified.

\*\*\*\*\*  
\*\*\* N U C L I D E M D A R E P O R T \*\*\*  
\*\*\*\*\*

Detector Name: 3844  
Sample Geometry:  
Sample Title: WGTV-10-QC 09/16/2017  
Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
+	K-40	1460.81*	10.67	3.5559E+005	3.56E+005	4.1223E+005
	SC-46	889.25	99.98	1.6891E+004	1.65E+004	1.4094E+004
		1120.51	99.99	1.6459E+004		1.8973E+003
	CO-57	122.06	85.51	1.9664E+004	1.97E+004	-3.4659E+003
		136.48	10.60	1.5146E+005		7.8395E+004
	CO-60	1173.22	100.00	1.7586E+004	1.37E+004	-6.8413E+002
		1332.49	100.00	1.3698E+004		-7.5902E+003
	SE-75	96.73	3.41	5.6531E+005	1.95E+004	-2.0581E+005
		121.11	16.70	1.0053E+005		3.0897E+003
		136.00	59.20	2.7223E+004		9.7951E+003
		198.60	1.45	8.7632E+005		-3.7137E+004
		264.65	59.80	1.9512E+004		-1.6319E+004
		279.53	25.20	4.8167E+004		-3.7422E+002
		303.91	1.32	8.9829E+005		4.0898E+004
		400.65	11.40	1.1474E+005		8.4565E+004
	KR-85	513.99	0.43	3.4877E+006	3.49E+006	2.5141E+006
	KR-85M	151.18	75.30	1.8998E+004	1.90E+004	1.0210E+004
		304.87	14.00	8.5584E+004		-6.1008E+002
	SR-85	513.99	99.27	1.5108E+004	1.51E+004	1.0891E+004
	Y-88	898.02	93.40	1.8203E+004	7.08E+003	-2.6860E+003
		1836.01	99.38	7.0787E+003		-5.3361E+003
	CD-109	88.03	3.72	6.3206E+005	6.32E+005	3.8989E+005
	SN-113	255.12	1.93	6.2778E+005	1.90E+004	6.2520E+004
		391.69	64.90	1.9006E+004		-9.9053E+003
	CS-134	475.35	1.46	9.3745E+005	1.59E+004	2.5446E+005
		563.23	8.38	1.6444E+005		5.4307E+004
		569.32	15.43	8.5659E+004		4.1679E+003
		604.70	97.60	1.5885E+004		-4.9632E+003
		795.84	85.40	1.7207E+004		-1.1952E+003
		801.93	8.73	1.6425E+005		-5.5473E+004
		1038.57	1.00	1.4005E+006		-5.4491E+005
		1167.94	1.80	1.0490E+006		-2.5687E+005
		1365.15	3.04	4.4718E+005		7.4710E+004
	CS-136	66.91	12.50	3.1368E+005	1.35E+004	-1.6168E+005
		86.29	6.30	3.8597E+005		-1.2972E+005
		153.22	7.46	1.8334E+005		-8.6495E+004
		163.89	4.61	3.0456E+005		2.2158E+005
		176.55	13.56	9.5668E+004		-8.8356E+004
		273.65	12.66	9.7446E+004		7.5851E+004
		340.57	48.50	2.7502E+004		2.9903E+004

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
CS-136	818.50	99.70	1.3500E+004	1.35E+004	-3.1551E+003
	1048.07	79.60	1.9530E+004		7.0331E+003
	1235.34	19.70	8.6958E+004		2.7120E+003
CS-137	661.65	85.12	2.2016E+004	2.20E+004	2.8280E+004
CS-138	138.10	1.49	1.2146E+006	1.76E+004	4.2298E+005
	227.76	1.51	9.9537E+005		5.9596E+004
	408.98	4.66	3.0422E+005		1.6417E+003
	462.79	30.70	4.3509E+004		-4.6442E+004
	546.94	10.80	1.0967E+005		-9.4623E+004
	871.80	5.11	2.7646E+005		1.1409E+005
	1009.78	29.80	5.2425E+004		-1.0109E+004
	1147.22	1.24	1.5698E+006		1.4447E+005
	1343.59	1.14	1.0408E+006		2.8082E+005
	1435.86	76.30	1.7609E+004		-6.1391E+003
CE-139	165.85	80.35	1.7305E+004	1.73E+004	5.3536E+003
EU-152	121.78	28.40	5.9747E+004	5.09E+004	-1.5493E+003
	244.69	7.49	1.7030E+005		-4.0136E+004
	344.27	26.50	5.0889E+004		2.2327E+004
	411.11	2.21	5.6648E+005		2.9630E+005
	443.98	3.11	3.8656E+005		-1.6344E+005
	778.89	12.74	9.8332E+004		-2.4162E+003
	867.32	4.16	3.3252E+005		1.3180E+005
	964.01	14.40	1.1413E+005		-8.4956E+004
	1085.78	10.00	1.7077E+005		1.1764E+005
	1112.02	13.30	1.2903E+005		-8.2916E+004
	1407.95	20.70	6.1939E+004		4.4827E+004
EU-154	123.07	40.40	4.2063E+004	4.21E+004	-5.9946E+003
	188.25	0.23	5.9838E+006		4.0314E+006
	247.93	6.83	1.7663E+005		-2.4393E+004
	401.30	0.19	6.8156E+006		4.4854E+006
	444.39	0.55	2.2545E+006		5.7385E+005
	478.26	0.21	6.1896E+006		-5.9170E+005
	557.56	0.25	5.1834E+006		5.0760E+005
	582.00	0.89	1.6689E+006		8.6171E+005
	591.76	4.91	2.5297E+005		2.9719E+004
	625.22	0.32	4.1653E+006		1.2313E+006
	676.59	0.14	9.1854E+006		3.6560E+006
	692.42	1.78	7.8541E+005		3.8112E+005
	715.76	0.17	7.0438E+006		-4.1532E+004
	722.30	20.00	7.2591E+004		-6.3759E+002
	756.86	4.50	3.0624E+005		-3.3467E+005
	815.55	0.50	2.6192E+006		1.9601E+005
	845.39	0.58	2.3721E+006		-9.7750E+005
	850.64	0.23	6.7514E+006		8.7005E+005
	873.20	12.09	9.9653E+004		-3.1921E+003
	892.73	0.50	3.3625E+006		1.6520E+005
	904.05	0.85	1.9048E+006		-1.7968E+006
	996.30	10.34	1.2966E+005		1.1947E+004
	1004.76	17.90	8.0013E+004		5.5390E+004
	1128.40	0.29	5.7318E+006		1.9175E+006

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
EU-154	1140.90	0.22	7.6990E+006	4.21E+004	1.1070E+006
	1241.60	0.13	1.4661E+007		6.0903E+006
	1246.60	0.80	2.2362E+006		-1.7113E+006
	1274.51	34.40	4.2880E+004		-2.0897E+004
	1494.08	0.71	1.1986E+006		-3.2913E+005
	1596.45	1.80	7.8399E+005		5.6740E+004
HG-203	279.19	77.30	1.5742E+004	1.57E+004	4.2108E+003
BI-214	609.31	46.30	3.7700E+004	3.77E+004	2.0091E+004
	768.36	5.04	3.0310E+005		6.1275E+004
	806.17	1.23	1.0827E+006		5.2195E+004
	934.06	3.21	4.4777E+005		2.3893E+005
	1120.29	15.10	1.0897E+005		1.2562E+004
	1155.19	1.69	1.0180E+006		-2.8415E+005
	1238.11	5.94	2.9980E+005		2.3162E+005
	1280.96	1.47	9.2842E+005		4.9849E+005
	1377.67	4.11	3.7806E+005		1.3282E+005
	1385.31	0.78	1.8025E+006		1.1349E+006
	1401.50	1.39	8.6399E+005		-1.1258E+005
	1407.98	2.48	5.1700E+005		3.7417E+005
	1509.19	2.19	5.4022E+005		-8.3938E+004
	1661.28	1.15	8.0014E+005		-6.2559E+005
	1729.60	3.05	4.3043E+005		2.6104E+005
	1764.49	15.80	1.1176E+005		9.7680E+004
	1847.44	2.12	4.7069E+005		-1.2746E+005
	2118.54	1.21	0.0000E+000		0.0000E+000
	74.81	6.33	5.3348E+005	3.48E+004	6.4183E+005
	77.11	10.70	2.8082E+005		-1.4488E+005
	87.20	3.70	6.4468E+005		1.4356E+005
	89.80	1.03	2.1943E+006		3.7970E+004
	241.98	7.49	1.7937E+005		-7.2057E+004
	295.21	19.20	6.7754E+004		5.7979E+004
	351.92	37.20	3.4779E+004		3.6072E+003
	785.91	1.10	1.2987E+006		6.7649E+005

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or has not been calculated

@ = Half-life too short to be able to perform the decay correction

Filename: C:\GENIE2K\CAMFILES\9.16.17\WGTV-10 9.16.17.CNF

Report Generated On : 9/16/2017 2:09:47 PM  
Sample Title : WGTV-10 09/16/2017 ✓  
Sample Description :  
Sample Identification :  
Sample Type :  
Sample Geometry : 3m-90d ✓  
Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 1 - 65535  
Peak Area Range (in channels) : 200 - 8000  
Identification Energy Tolerance : 1.000 keV  
Sample Size : 2.830E+001 m2 ✓  
Sample Taken On : 9/16/2017 10:38:00 AM  
Acquisition Started : 9/16/2017 10:38:19 AM ✓  
Live Time : 600.0 seconds ✓  
Dead Time : 600.2 seconds  
Bad Time : 0.03 % ✓

Energy Calibration Used Done On : 10/12/2016  
Efficiency Calibration Used Done On : 12/16/2016  
Efficiency ID : ULAR\_\_PLANE\_90D\_

REVIEWED  
Joe D. Jank  
10/24/17

\*\*\*\*\*  
\*\*\* P E A K A N A L Y S I S R E P O R T \*\*\*\*\*  
\*\*\*\*\*

Detector Name: 3844

Sample Title: WGTV-10 09/16/2017

Peak Analysis Performed on: 9/16/2017 2:09:47 PM

Peak Analysis From Channel: 200

Peak Analysis To Channel: 8000

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	1495-	1505	1500.34	375.18	0.35	1.24E+001	14.45	1.56E+001

= First peak in a multiplet region

= Other peak in a multiplet region

= Fitted singlet

Errors quoted at 1.960 sigma



\*\*\*\*\*  
 \*\*\*    N U C L I D E    I D E N T I F I C A T I O N    R E P O R T    \*\*\*  
 \*\*\*\*\*

Sample Title:                    WGTV-10 09/16/2017  
 Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/m2 )	Activity Uncertainty
-----------------	------------------	-----------------	--------------	-----------------------	-------------------------

\* = Energy line found in the spectrum.  
 @ = Energy line not used for Weighted Mean Activity  
 Energy Tolerance :      1.000 keV  
 Nuclide confidence index threshold =      0.30  
 Errors quoted at    1.960 sigma

\*\*\*\*\*  
\*\*\* I N T E R F E R E N C E C O R R E C T E D R E P O R T \*\*\*  
\*\*\*\*\*

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/m2 )	Wt mean Activity Uncertainty
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? = Nuclide is part of an undetermined solution

X = Nuclide rejected by the interference analysis

@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

\*\*\*\*\* U N I D E N T I F I E D P E A K S \*\*\*\*\*

Peak Locate Performed on: 9/16/2017 2:09:47 PM  
Peak Locate From Channel: 200  
Peak Locate To Channel: 8000

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	375.18	2.0595E-002	116.92		<i>Pa<sup>234</sup></i>

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.960 sigma

\*\*\*\*\*  
\*\*\* N U C L I D E M D A R E P O R T \*\*\*  
\*\*\*\*\*

Detector Name: 3844  
Sample Geometry:  
Sample Title: WGTV-10 09/16/2017  
Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
K-40	1460.81	10.67	4.5041E+005	4.50E+005	1.4610E+006
SC-46	889.25	99.98	1.3723E+004	1.37E+004	2.4447E+003
	1120.51	99.99	1.5837E+004		-1.1710E+001
CO-57	122.06	85.51	1.9641E+004	1.96E+004	-1.1209E+004
	136.48	10.60	1.4226E+005		1.5915E+004
CO-60	1173.22	100.00	1.6971E+004	1.34E+004	8.6681E+003
	1332.49	100.00	1.3376E+004		6.6627E+003
SE-75	96.73	3.41	5.8465E+005	2.03E+004	2.0943E+004
	121.11	16.70	1.0053E+005		-5.1086E+003
	136.00	59.20	2.5475E+004		-3.6644E+003
	198.60	1.45	9.0525E+005		-4.6298E+004
	264.65	59.80	2.0313E+004		-4.8679E+003
	279.53	25.20	4.7861E+004		1.7572E+003
	303.91	1.32	9.3055E+005		-5.6389E+004
	400.65	11.40	1.0093E+005		-5.1240E+004
KR-85	513.99	0.43	3.6712E+006	3.67E+006	1.7332E+006
KR-85M	151.18	75.30	1.9071E+004	1.91E+004	5.2149E+003
	304.87	14.00	8.8846E+004		1.7348E+004
SR-85	513.99	99.27	1.5903E+004	1.59E+004	7.5080E+003
Y-88	898.02	93.40	1.5897E+004	8.21E+003	1.3452E+003
	1836.01	99.38	8.2060E+003		-1.5246E+003
CD-109	88.03	3.72	6.3533E+005	6.35E+005	-2.1651E+004
SN-113	255.12	1.93	6.3315E+005	1.72E+004	-2.0168E+005
	391.69	64.90	1.7237E+004		-3.7122E+003
CS-134	475.35	1.46	7.9736E+005	1.49E+004	1.3579E+005
	563.23	8.38	1.4447E+005		-1.6847E+005
	569.32	15.43	8.7538E+004		9.4222E+003
	604.70	97.60	1.4934E+004		-8.9269E+003
	795.84	85.40	1.8631E+004		2.9914E+003
	801.93	8.73	1.8171E+005		-6.5244E+004
	1038.57	1.00	1.3561E+006		-5.5211E+005
	1167.94	1.80	9.3998E+005		-1.3109E+005
	1365.15	3.04	3.3200E+005		-2.3409E+005
CS-136	66.91	12.50	3.2244E+005	1.47E+004	-3.9528E+004
	86.29	6.30	3.8196E+005		1.9666E+005
	153.22	7.46	1.8911E+005		1.2751E+005
	163.89	4.61	2.8392E+005		8.7169E+004
	176.55	13.56	9.2509E+004		-3.8396E+004
	273.65	12.66	9.8601E+004		-2.0274E+004
	340.57	48.50	2.5046E+004		-9.5435E+002

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
CS-136	818.50	99.70	1.4736E+004	1.47E+004	1.6374E+004
	1048.07	79.60	1.6262E+004		1.5306E+004
	1235.34	19.70	9.7556E+004		8.6288E+003
CS-137	661.65	85.12	2.3806E+004	2.38E+004	2.6162E+004
CS-138	138.10	1.49	1.1230E+006	1.85E+004	-1.5669E+005
	227.76	1.51	9.9463E+005		-7.9682E+004
	408.98	4.66	3.0113E+005		1.3142E+005
	462.79	30.70	4.5450E+004		3.7560E+003
	546.94	10.80	1.3420E+005		-4.4166E+004
	871.80	5.11	2.6799E+005		-4.2380E+004
	1009.78	29.80	5.2425E+004		-4.2773E+004
	1147.22	1.24	1.3300E+006		-1.7622E+006
	1343.59	1.14	1.4138E+006		1.2357E+006
	1435.86	76.30	1.8531E+004		8.0610E+003
CE-139	165.85	80.35	1.6356E+004	1.64E+004	3.2234E+003
EU-152	121.78	28.40	5.9401E+004	4.73E+004	-2.9359E+004
	244.69	7.49	1.7648E+005		1.6602E+004
	344.27	26.50	4.7317E+004		-1.1085E+003
	411.11	2.21	5.4877E+005		-2.4214E+005
	443.98	3.11	4.0078E+005		-5.9585E+005
	778.89	12.74	1.0570E+005		-1.5456E+005
	867.32	4.16	2.9771E+005		-2.6254E+004
	964.01	14.40	1.1750E+005		1.3749E+004
	1085.78	10.00	1.8504E+005		1.9161E+005
	1112.02	13.30	1.1686E+005		-1.8047E+002
	1407.95	20.70	6.5417E+004		-5.1815E+004
EU-154	123.07	40.40	4.2111E+004	4.21E+004	-2.3086E+004
	188.25	0.23	5.7474E+006		-5.4239E+006
	247.93	6.83	1.7414E+005		-6.6088E+004
	401.30	0.19	5.9337E+006		-1.7844E+006
	444.39	0.55	2.3325E+006		-1.9093E+006
	478.26	0.21	5.7302E+006		2.2513E+006
	557.56	0.25	4.4159E+006		-1.5200E+006
	582.00	0.89	1.7177E+006		1.6622E+006
	591.76	4.91	2.6181E+005		-2.6513E+005
	625.22	0.32	4.1653E+006		2.9286E+006
	676.59	0.14	9.5691E+006		2.8580E+006
	692.42	1.78	7.1321E+005		-4.5328E+005
	715.76	0.17	8.7731E+006		6.2998E+006
	722.30	20.00	7.4434E+004		-4.3076E+004
	756.86	4.50	3.3027E+005		-9.1780E+004
	815.55	0.50	2.6522E+006		1.5662E+005
	845.39	0.58	2.6152E+006		1.1131E+006
	850.64	0.23	6.2199E+006		-6.0218E+005
	873.20	12.09	1.0130E+005		1.1651E+004
	892.73	0.50	2.5914E+006		-7.5838E+005
	904.05	0.85	2.0922E+006		-1.0743E+006
	996.30	10.34	1.3772E+005		1.8164E+003
	1004.76	17.90	7.7709E+004		-7.4106E+004
	1128.40	0.29	4.9092E+006		-3.3885E+006

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
EU-154	1140.90	0.22	6.5939E+006	4.21E+004	-3.8701E+006
	1241.60	0.13	1.4985E+007		5.1382E+006
	1246.60	0.80	2.1257E+006		-1.2311E+005
	1274.51	34.40	4.5205E+004		-2.5224E+003
	1494.08	0.71	1.7210E+006		1.0971E+006
	1596.45	1.80	6.5891E+005		1.2672E+005
	279.19	77.30	1.5841E+004	1.58E+004	6.2368E+003
HG-203	609.31	46.30	3.3468E+004	3.35E+004	1.0810E+004
BI-214	768.36	5.04	3.0054E+005		-1.1060E+005
	806.17	1.23	1.1579E+006		2.6772E+005
	934.06	3.21	3.9957E+005		-2.0197E+005
	1120.29	15.10	1.0485E+005		-7.7528E+001
	1155.19	1.69	9.8149E+005		-1.0243E+006
	1238.11	5.94	3.3052E+005		1.1569E+005
	1280.96	1.47	1.1937E+006		5.1583E+005
	1377.67	4.11	3.3279E+005		3.3359E+004
	1385.31	0.78	1.4760E+006		-3.5743E+006
	1401.50	1.39	1.0428E+006		-3.7696E+005
	1407.98	2.48	5.4603E+005		-4.3249E+005
	1509.19	2.19	5.1883E+005		2.9784E+005
	1661.28	1.15	8.0014E+005		3.0516E+005
	1729.60	3.05	4.3043E+005		2.6104E+005
	1764.49	15.80	9.0618E+004		6.0468E+004
	1847.44	2.12	5.0634E+005		2.5431E+004
	2118.54	1.21	0.0000E+000		0.0000E+000
	74.81	6.33	4.9129E+005	3.62E+004	8.1903E+004
> PB-214	77.11	10.70	2.6120E+005		4.1113E+004
	87.20	3.70	6.4669E+005		2.4943E+005
	89.80	1.03	2.2424E+006		-5.4694E+005
	241.98	7.49	1.8325E+005		1.2736E+005
	295.21	19.20	6.5338E+004		2.0552E+004
	351.92	37.20	3.6203E+004		5.4486E+004
	785.91	1.10	1.2455E+006		1.4214E+005

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or has not been calculated

@ = Half-life too short to be able to perform the decay correction

Filename: C:\GENIE2K\CAMFILES\9.16.17\WGTV-09 09162017.CNF

Report Generated On : 9/16/2017 2:08:55 PM

Sample Title : WGTV-09 09/16/2017 ✓  
Sample Description :  
Sample Identification :  
Sample Type :  
Sample Geometry : 3m-90d ✓

Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 1 - 65535  
Peak Area Range (in channels) : 200 - 8000  
Identification Energy Tolerance : 1.000 keV ✓

Sample Size : 2.830E+001 m2

Sample Taken On : 9/16/2017 9:58:00 AM ✓  
Acquisition Started : 9/16/2017 9:58:47 AM ✓

Live Time : 600.0 seconds ✓  
Dead Time : 600.2 seconds

Dead Time : 0.04 % ✓

Energy Calibration Used Done On : 10/12/2016  
Efficiency Calibration Used Done On : 12/16/2016  
Efficiency ID : ULAR\_\_PLANE\_90D\_

REVIEWED  
Joe O. Jackson  
10/2/17

Peak analysis results available for reporting purposes

\*\*\*\*\*  
 \*\*\* N U C L I D E I D E N T I F I C A T I O N R E P O R T \*\*\*  
 \*\*\*\*\*

Sample Title: WGTV-09 09/16/2017  
 Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide	Id	Energy	Yield	Activity	Activity
Name	Confidence	(keV)	(%)	(pCi/m2 )	Uncertainty

\* = Energy line found in the spectrum.  
 @ = Energy line not used for Weighted Mean Activity  
 Energy Tolerance : 1.000 keV  
 Nuclide confidence index threshold = 0.30  
 Errors quoted at 1.960 sigma



\*\*\*\*\*  
 \*\*\* I N T E R F E R E N C E C O R R E C T E D R E P O R T \*\*\*  
 \*\*\*\*\*

Nuclide	Nuclide	Wt mean	Wt mean
Name	Id	Activity	Activity
	Confidence	(pCi/m2 )	Uncertainty

? = Nuclide is part of an undetermined solution  
 X = Nuclide rejected by the interference analysis  
 @ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

Peak search results available for nuclide analysis.

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\*\*\* N U C L I D E M D A R E P O R T \*\*\*\*\*  
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Detector Name: 3844  
Sample Geometry:  
Sample Title: WGTV-09 09/16/2017  
Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
K-40	1460.81	10.67	4.3782E+005	4.38E+005	1.3342E+006
SC-46	889.25	99.98	1.4418E+004	1.44E+004	3.0087E+003
	1120.51	99.99	1.9752E+004		1.1101E+004
CO-57	122.06	85.51	1.8522E+004	1.85E+004	2.5276E+003
	136.48	10.60	1.4675E+005		-3.1722E+004
CO-60	1173.22	100.00	1.5659E+004	1.30E+004	-8.8716E+003
	1332.49	100.00	1.3045E+004		-1.1007E+004
SE-75	96.73	3.41	5.9594E+005	2.04E+004	-1.4172E+005
	121.11	16.70	9.4633E+004		-4.4003E+004
	136.00	59.20	2.6544E+004		1.4829E+004
	198.60	1.45	8.7459E+005		-1.7186E+004
	264.65	59.80	2.0373E+004		-2.2592E+004
	279.53	25.20	4.8014E+004		-8.9488E+003
	303.91	1.32	9.5555E+005		1.7935E+004
	400.65	11.40	1.1422E+005		7.2305E+004
KR-85	513.99	0.43	3.3831E+006	3.38E+006	1.3902E+006
KR-85M	151.18	75.30	1.8714E+004	1.87E+004	-2.1736E+003
	304.87	14.00	9.1359E+004		-5.9344E+003
SR-85	513.99	99.27	1.4655E+004	1.47E+004	6.0221E+003
Y-88	898.02	93.40	1.4595E+004	8.21E+003	-2.0790E+003
	1836.01	99.38	8.2060E+003		-9.3381E+003
CD-109	88.03	3.72	6.5772E+005	6.58E+005	-2.3359E+005
SN-113	255.12	1.93	6.7785E+005	1.76E+004	5.4735E+004
	391.69	64.90	1.7646E+004		-8.6436E+003
CS-134	475.35	1.46	8.9683E+005	1.58E+004	-1.8105E+005
	563.23	8.38	1.5184E+005		-4.1270E+004
	569.32	15.43	8.8154E+004		7.2092E+004
	604.70	97.60	1.5793E+004		6.4985E+003
	795.84	85.40	1.6872E+004		-1.1867E+004
	801.93	8.73	1.6085E+005		-6.4191E+003
	1038.57	1.00	1.5834E+006		-8.8282E+004
	1167.94	1.80	9.2830E+005		-1.8441E+005
	1365.15	3.04	4.4718E+005		7.4710E+004
CS-136	66.91	12.50	3.1887E+005	1.50E+004	-3.6362E+004
	86.29	6.30	4.0230E+005		2.7208E+005
	153.22	7.46	1.8528E+005		8.4324E+004
	163.89	4.61	2.8779E+005		1.2287E+005
	176.55	13.56	9.8385E+004		1.3333E+004
	273.65	12.66	1.0473E+005		4.6106E+004
	340.57	48.50	2.4734E+004		-3.5711E+002

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
CS-136	818.50	99.70	1.5028E+004	1.50E+004	-1.2903E+003
	1048.07	79.60	1.8247E+004		-9.9110E+003
	1235.34	19.70	8.8080E+004		6.0642E+004
CS-137	661.65	85.12	2.5633E+004	2.56E+004	4.8191E+004
CS-138	138.10	1.49	1.1807E+006	1.62E+004	3.3639E+005
	227.76	1.51	9.2074E+005		-2.0102E+005
	408.98	4.66	3.2067E+005		1.1209E+005
	462.79	30.70	4.6751E+004		2.1567E+004
	546.94	10.80	1.3556E+005		-5.3897E+004
	871.80	5.11	3.2905E+005		-1.1922E+004
	1009.78	29.80	4.8785E+004		-2.8253E+004
	1147.22	1.24	1.3649E+006		-1.2783E+006
	1343.59	1.14	1.3976E+006		3.4176E+005
	1435.86	76.30	1.6210E+004		-3.9550E+003
CE-139	165.85	80.35	1.6851E+004	1.69E+004	6.0826E+003
EU-152	121.78	28.40	5.6115E+004	4.40E+004	2.5639E+004
	244.69	7.49	1.8705E+005		6.5867E+004
	344.27	26.50	4.4040E+004		-1.8474E+004
	411.11	2.21	5.7511E+005		-2.9642E+005
	443.98	3.11	4.3201E+005		2.4722E+005
	778.89	12.74	1.1032E+005		-1.3010E+004
	867.32	4.16	3.7828E+005		5.6737E+004
	964.01	14.40	1.2184E+005		8.5771E+004
	1085.78	10.00	1.6312E+005		9.3236E+004
	1112.02	13.30	1.3328E+005		-7.8887E+004
	1407.95	20.70	6.5417E+004		-3.4367E+004
EU-154	123.07	40.40	3.9280E+004	3.93E+004	-1.6618E+004
	188.25	0.23	5.7574E+006		6.6224E+005
	247.93	6.83	1.9537E+005		-1.2702E+005
	401.30	0.19	6.7851E+006		1.9441E+006
	444.39	0.55	2.4445E+006		1.9711E+006
	478.26	0.21	5.9262E+006		1.2350E+006
	557.56	0.25	5.0323E+006		-4.4369E+004
	582.00	0.89	1.8736E+006		1.9119E+006
	591.76	4.91	2.8260E+005		-3.2388E+005
	625.22	0.32	3.9486E+006		1.4403E+006
	676.59	0.14	8.5747E+006		-4.2452E+006
	692.42	1.78	8.1235E+005		-1.6772E+005
	715.76	0.17	7.5583E+006		-4.6826E+005
	722.30	20.00	7.7981E+004		4.8670E+004
	756.86	4.50	3.2444E+005		-9.7814E+004
	815.55	0.50	3.0455E+006		-1.1632E+005
	845.39	0.58	2.5894E+006		9.2415E+004
	850.64	0.23	6.4248E+006		7.1098E+006
	873.20	12.09	1.2828E+005		5.5999E+004
	892.73	0.50	2.7791E+006		-1.5109E+006
	904.05	0.85	1.7351E+006		1.2649E+006
	996.30	10.34	1.4713E+005		1.1506E+005
	1004.76	17.90	7.7709E+004		5.1318E+004
	1128.40	0.29	5.8679E+006		-9.2107E+006

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
EU-154	1140.90	0.22	7.1197E+006	3.93E+004	3.9629E+006
	1241.60	0.13	1.3460E+007		-1.1225E+007
	1246.60	0.80	1.9779E+006		-3.1544E+006
	1274.51	34.40	4.0404E+004		2.5484E+004
	1494.08	0.71	1.4506E+006		-2.1828E+006
	1596.45	1.80	6.5891E+005		1.4563E+005
HG-203	279.19	77.30	1.5742E+004	1.57E+004	-7.8793E+002
BI-214	609.31	46.30	3.1648E+004	3.16E+004	3.9590E+003
	768.36	5.04	3.0054E+005		4.5252E+004
	806.17	1.23	1.1458E+006		-4.9816E+005
	934.06	3.21	4.8048E+005		-2.9593E+004
	1120.29	15.10	1.3078E+005		7.3498E+004
	1155.19	1.69	1.0060E+006		-9.0250E+004
	1238.11	5.94	2.7724E+005		1.5715E+005
	1280.96	1.47	1.0068E+006		-7.4032E+003
	1377.67	4.11	3.8503E+005		1.5093E+005
	1385.31	0.78	1.7164E+006		-1.5798E+005
	1401.50	1.39	1.0428E+006		8.8697E+005
	1407.98	2.48	5.4603E+005		-2.8686E+005
	1509.19	2.19	5.6065E+005		-4.8152E+005
	1661.28	1.15	1.0171E+006		-3.8146E+005
	1729.60	3.05	3.9547E+005		5.5373E+004
	1764.49	15.80	1.0441E+005		8.3725E+004
	1847.44	2.12	4.7069E+005		1.7952E+005
	2118.54	1.21	0.0000E+000		0.0000E+000
	74.81	6.33	5.0576E+005	3.53E+004	-7.6453E+004
	77.11	10.70	2.7465E+005		7.9428E+004
	87.20	3.70	6.6635E+005		-2.1765E+005
	89.80	1.03	2.3072E+006		-1.1228E+006
	241.98	7.49	1.9477E+005		4.3640E+004
	295.21	19.20	6.9892E+004		1.7921E+004
	351.92	37.20	3.5304E+004		2.9941E+004
	785.91	1.10	1.3244E+006		-3.8594E+005

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or has not been calculated

@ = Half-life too short to be able to perform the decay correction

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 \*\*\* G A M M A S P E C T R U M A N A L Y S I S \*\*\*  
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Filename: C:\GENIE2K\CAMFILES\9.16.17\WGTV-08 9.16.17.CNF ✓

Report Generated On : 9/16/2017 1:16:53 PM

Sample Title : WGTV-08 09/16/2017  
 Sample Description :  
 Sample Identification :  
 Sample Type :  
 Sample Geometry : 3m - 90d ✓

Peak Locate Threshold : 3.00  
 Peak Locate Range (in channels) : 1 - 65535  
 Peak Area Range (in channels) : 200 - 8000  
 Identification Energy Tolerance : 1.000 keV

Sample Size : 2.830E+001 m2 ✓

Sample Taken On : 9/16/2017 10:11:00 AM  
 Acquisition Started : 9/16/2017 10:12:50 AM ✓

Live Time : 600.0 seconds ✓  
 Real Time : 600.2 seconds

Dead Time : 0.03 % ✓

Energy Calibration Used Done On : 10/12/2016  
 Efficiency Calibration Used Done On : 12/16/2016  
 Efficiency ID : ULAR\_\_PLANE\_90D\_ ✓

*revised*  
*Jim O'Quinn*  
*10/2/17*

peak analysis results available for reporting purposes

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 \*\*\* N U C L I D E I D E N T I F I C A T I O N R E P O R T \*\*\*  
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Sample Title: WGTV-08 09/16/2017  
 Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/m2 )	Activity Uncertainty
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\* = Energy line found in the spectrum.  
 @ = Energy line not used for Weighted Mean Activity  
 Energy Tolerance : 1.000 keV  
 Nuclide confidence index threshold = 0.30  
 Errors quoted at 1.960 sigma

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 \*\*\* I N T E R F E R E N C E   C O R R E C T E D   R E P O R T   \*\*\*\*\*  
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Nuclide		Wt mean	Wt mean
Nuclide	Id	Activity	Activity
Name	Confidence	(pCi/m2 )	Uncertainty

? = Nuclide is part of an undetermined solution  
 X = Nuclide rejected by the interference analysis  
 @ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

o peak search results available for nuclide analysis.



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\*\*\* N U C L I D E M D A R E P O R T \*\*\*  
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Detector Name: 3844  
Sample Geometry:  
Sample Title: WGTV-08 09/16/2017  
Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
K-40	1460.81	10.67	4.5918E+005	4.59E+005	1.4356E+006
SC-46	889.25	99.98	1.3900E+004	1.39E+004	4.1483E+003
	1120.51	99.99	1.8004E+004		9.4102E+003
CO-57	122.06	85.51	1.9548E+004	1.95E+004	7.6065E+003
	136.48	10.60	1.4093E+005		2.9396E+004
CO-60	1173.22	100.00	1.6109E+004	1.40E+004	-4.5153E+003
	1332.49	100.00	1.4012E+004		-6.8978E+003
SE-75	96.73	3.41	6.0151E+005	2.02E+004	4.8635E+005
	121.11	16.70	1.0053E+005		-3.9595E+002
	136.00	59.20	2.5372E+004		1.0972E+004
	198.60	1.45	8.8836E+005		-8.0342E+004
	264.65	59.80	2.0192E+004		2.0114E+004
	279.53	25.20	4.6143E+004		-2.1243E+004
	303.91	1.32	9.4001E+005		8.3508E+005
	400.65	11.40	1.0442E+005		-6.3355E+003
KR-85	513.99	0.43	3.6385E+006	3.64E+006	-8.0781E+005
KR-85M	151.18	75.30	1.8792E+004	1.88E+004	1.1937E+004
	304.87	14.00	8.7961E+004		-1.7975E+004
SR-85	513.99	99.27	1.5762E+004	1.58E+004	-3.4993E+003
Y-88	898.02	93.40	1.5168E+004	1.27E+004	-1.6625E+003
	1836.01	99.38	1.2703E+004		6.8607E+003
CD-109	88.03	3.72	6.2812E+005	6.28E+005	-6.3639E+005
SN-113	255.12	1.93	5.9638E+005	1.77E+004	-1.9266E+005
	391.69	64.90	1.7747E+004		-2.5071E+003
CS-134	475.35	1.46	8.6503E+005	1.46E+004	-4.2916E+004
	563.23	8.38	1.5538E+005		4.4624E+004
	569.32	15.43	8.5659E+004		-7.1172E+004
	604.70	97.60	1.4636E+004		-1.1645E+004
	795.84	85.40	1.6357E+004		-3.2238E+003
	801.93	8.73	1.5381E+005		3.4456E+004
	1038.57	1.00	1.4005E+006		1.1224E+006
	1167.94	1.80	1.0176E+006		7.1376E+005
	1365.15	3.04	4.6846E+005		2.0670E+005
CS-136	66.91	12.50	3.1369E+005	1.43E+004	-1.3642E+005
	86.29	6.30	3.8717E+005		7.2583E+004
	153.22	7.46	1.8501E+005		-3.1877E+004
	163.89	4.61	2.9538E+005		-8.7809E+002
	176.55	13.56	9.2692E+004		1.6020E+003
	273.65	12.66	9.0807E+004		-4.1010E+002
	340.57	48.50	2.5047E+004		6.5597E+003

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
CS-136	818.50	99.70	1.4287E+004	1.43E+004	2.0431E+003
	1048.07	79.60	1.5957E+004		-6.1560E+003
	1235.34	19.70	9.6558E+004		1.4317E+004
CS-137	661.65	85.12	2.0379E+004	2.04E+004	1.3594E+004
CS-138	138.10	1.49	1.1695E+006	1.97E+004	2.6598E+004
	227.76	1.51	9.9975E+005		3.7959E+005
	408.98	4.66	3.0951E+005		2.4169E+005
	462.79	30.70	4.5180E+004		1.4348E+004
	546.94	10.80	1.3137E+005		2.6042E+003
	871.80	5.11	2.7685E+005		1.7151E+005
	1009.78	29.80	5.2499E+004		4.0139E+003
	1147.22	1.24	1.4175E+006		1.5755E+005
	1343.59	1.14	1.1442E+006		3.8625E+005
	1435.86	76.30	1.9726E+004		2.0304E+003
CE-139	165.85	80.35	1.7012E+004	1.70E+004	9.4609E+003
EU-152	121.78	28.40	5.8913E+004	4.52E+004	3.3684E+004
	244.69	7.49	1.7156E+005		-1.9537E+004
	344.27	26.50	4.5225E+004		-4.7017E+004
	411.11	2.21	5.8642E+005		2.6169E+005
	443.98	3.11	3.9610E+005		2.8961E+004
	778.89	12.74	1.0451E+005		1.1049E+005
	867.32	4.16	2.8828E+005		-2.4069E+005
	964.01	14.40	1.2290E+005		-3.2476E+004
	1085.78	10.00	1.4427E+005		1.2992E+004
	1112.02	13.30	1.1524E+005		7.2458E+004
	1407.95	20.70	5.2057E+004		-3.5861E+004
EU-154	123.07	40.40	4.1190E+004	4.12E+004	7.3341E+003
	188.25	0.23	6.1643E+006		4.1252E+006
	247.93	6.83	1.8054E+005		-6.7018E+004
	401.30	0.19	6.1752E+006		-1.3044E+006
	444.39	0.55	2.2279E+006		-1.5842E+006
	478.26	0.21	6.1156E+006		-1.5325E+005
	557.56	0.25	4.8362E+006		-4.3613E+006
	582.00	0.89	1.7929E+006		8.9135E+005
	591.76	4.91	2.6823E+005		-1.1935E+005
	625.22	0.32	3.9112E+006		7.6431E+005
	676.59	0.14	1.0377E+007		3.1283E+006
	692.42	1.78	7.5025E+005		-3.2476E+005
	715.76	0.17	7.3912E+006		-8.2951E+005
	722.30	20.00	6.7409E+004		-6.0252E+004
	756.86	4.50	2.9669E+005		-6.3203E+004
	815.55	0.50	2.9306E+006		7.2424E+005
	845.39	0.58	2.2549E+006		1.0836E+006
	850.64	0.23	5.7104E+006		-9.3726E+005
	873.20	12.09	1.0291E+005		-1.0642E+005
	892.73	0.50	2.9538E+006		7.4689E+005
	904.05	0.85	1.9578E+006		2.2689E+005
	996.30	10.34	1.4530E+005		7.8949E+004
	1004.76	17.90	8.2246E+004		3.1701E+004
	1128.40	0.29	5.7318E+006		-3.1045E+006

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
EU-154	1140.90	0.22	7.0180E+006	4.12E+004	4.1066E+006
	1241.60	0.13	1.5457E+007		5.6000E+006
	1246.60	0.80	2.2362E+006		-2.0445E+006
	1274.51	34.40	4.1248E+004		-6.1989E+004
	1494.08	0.71	1.4506E+006		7.3140E+005
	1596.45	1.80	6.0015E+005		3.0261E+005
HG-203	279.19	77.30	1.5085E+004	1.51E+004	-8.3467E+003
BI-214	609.31	46.30	3.1438E+004	3.14E+004	3.6488E+003
	768.36	5.04	2.8733E+005		1.5663E+005
	806.17	1.23	1.1458E+006		8.4391E+005
	934.06	3.21	4.4207E+005		-1.3651E+005
	1120.29	15.10	1.1920E+005		6.2302E+004
	1155.19	1.69	9.8149E+005		-1.9320E+005
	1238.11	5.94	3.4009E+005		3.4013E+005
	1280.96	1.47	9.0762E+005		-1.6625E+005
	1377.67	4.11	3.1605E+005		-1.4456E+005
	1385.31	0.78	1.5773E+006		-5.0408E+005
	1401.50	1.39	8.9207E+005		6.6523E+004
	1407.98	2.48	4.3451E+005		-2.9933E+005
	1509.19	2.19	4.7256E+005		2.3828E+005
	1661.28	1.15	9.6835E+005		4.8826E+005
	1729.60	3.05	4.1338E+005		8.1873E+004
	1764.49	15.80	6.5599E+004		-5.8143E+002
	1847.44	2.12	5.0634E+005		-3.3210E+005
	2118.54	1.21	0.0000E+000		0.0000E+000
> PB-214	74.81	6.33	5.3179E+005	3.62E+004	3.0441E+005
	77.11	10.70	2.8656E+005		2.4669E+005
	87.20	3.70	6.4868E+005		-5.8935E+004
	89.80	1.03	2.2582E+006		1.0835E+006
	241.98	7.49	1.8132E+005		-9.2708E+003
	295.21	19.20	6.6959E+004		1.0904E+004
	351.92	37.20	3.6203E+004		1.8328E+004
	785.91	1.10	1.1459E+006		-3.4303E+005

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or has not been calculated

@ = Half-life too short to be able to perform the decay correction

\*\*\*\*\*  
\*\*\* G A M M A S E C T R U M A N A L Y I S \*\*\*\*\*  
\*\*\*\*\*

Filename: C:\GENIE2K\CAMFILES\9.18.17\WGTV 07.CNF ✓

Report Generated On : 9/18/2017 3:42:04 PM

Sample Title : WGTV 07

Sample Description :

Sample Identification :

Sample Type :

Sample Geometry : 3m\_90d ✓

Peak Locate Threshold : 3.00

Peak Locate Range (in channels) : 1 - 65535

Peak Area Range (in channels) : 200 - 8000

Identification Energy Tolerance : 1.000 keV

Sample Size : 2.830E+001 m2 ✓

Sample Taken On : 9/18/2017 9:36:00 AM

Acquisition Started : 9/18/2017 9:36:48 AM ✓

Live Time : 600.0 seconds ✓

Real Time : 600.2 seconds

Dead Time : 0.03 % ✓

Energy Calibration Used Done On : 10/12/2016

Efficiency Calibration Used Done On : 12/16/2016

Efficiency ID : ULAR\_\_PLANE\_90D\_

REVIEWED  
Joe O. Jentzen  
10/24/17

\*\*\*\*\*  
\*\*\* P E A K A N A L Y S I S R E P O R T \*\*\*\*\*  
\*\*\*\*\*

Detector Name: 3844

Sample Title: WGTV 07

Peak Analysis Performed on: 9/18/2017 3:42:04 PM

Peak Analysis From Channel: 200

Peak Analysis To Channel: 8000

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	1119-	1128	1123.24	280.85	0.77	1.93E+001	16.56	2.27E+001
2	5827-	5856	5841.10	1460.01	0.31	2.04E+002	35.14	2.52E+001

= First peak in a multiplet region

= Other peak in a multiplet region

= Fitted singlet

Errors quoted at 1.960 sigma

\*\*\*\*\*  
 \*\*\* N U C L I D E I D E N T I F I C A T I O N R E P O R T \*\*\*  
 \*\*\*\*\*

Sample Title: WGTV 07  
 Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/m2 )	Activity Uncertainty
K-40	0.902	1460.81*	10.67	1.21452E+006	2.31365E+005

\* = Energy line found in the spectrum.  
 @ = Energy line not used for Weighted Mean Activity  
 Energy Tolerance : 1.000 keV  
 Nuclide confidence index threshold = 0.30  
 Errors quoted at 1.960 sigma

\*\*\*\*\*  
 \*\*\* I N T E R F E R E N C E C O R R E C T E D R E P O R T \*\*\*  
 \*\*\*\*\*

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/m2 )	Wt mean Activity Uncertainty
K-40	0.902	1.214517E+006	2.313649E+005

? = Nuclide is part of an undetermined solution  
 X = Nuclide rejected by the interference analysis  
 @ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

\*\*\*\*\* U N I D E N T I F I E D P E A K S \*\*\*\*\*

Peak Locate Performed on: 9/18/2017 3:42:04 PM  
 Peak Locate From Channel: 200  
 Peak Locate To Channel: 8000

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	280.85	3.2153E-002	85.84		Pb <sup>214</sup>

M = First peak in a multiplet region  
 m = Other peak in a multiplet region  
 F = Fitted singlet

Errors quoted at 1.960 sigma

\*\*\*\*\*  
\*\*\* N U C L I D E M D A R E P O R T \*\*\*  
\*\*\*\*\*

Detector Name: 3844  
Sample Geometry: 3m 90d  
Sample Title: WGTV 07  
Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
+	K-40	1460.81*	10.67	2.2879E+005	2.29E+005	1.2145E+006
	SC-46	889.25	99.98	1.0907E+004	1.09E+004	-4.2852E+003
		1120.51	99.99	1.9074E+004		1.2149E+004
	CO-57	122.06	85.51	1.8399E+004	1.84E+004	-9.8454E+002
		136.48	10.60	1.5003E+005		1.6762E+005
	CO-60	1173.22	100.00	1.7786E+004	1.40E+004	1.1537E+004
		1332.49	100.00	1.4012E+004		8.0151E+003
	SE-75	96.73	3.41	5.6858E+005	2.13E+004	-3.0107E+004
		121.11	16.70	9.5893E+004		-6.7354E+003
		136.00	59.20	2.6805E+004		1.5484E+004
		198.60	1.45	8.6937E+005		-8.6693E+005
		264.65	59.80	2.1255E+004		-6.9222E+003
		279.53	25.20	4.4685E+004		3.5496E+003
		303.91	1.32	8.9829E+005		7.5971E+004
		400.65	11.40	1.0327E+005		3.8762E+004
	KR-85	513.99	0.43	3.4532E+006	3.45E+006	-1.1672E+006
	KR-85M	151.18	75.30	1.8297E+004	1.83E+004	-1.2310E+004
		304.87	14.00	8.4574E+004		4.9855E+004
	SR-85	513.99	99.27	1.4959E+004	1.50E+004	-5.0561E+003
	Y-88	898.02	93.40	1.2474E+004	1.14E+004	-2.1860E+003
		1836.01	99.38	1.1447E+004		5.3361E+003
	CD-109	88.03	3.72	5.9213E+005	5.92E+005	4.4426E+005
	SN-113	255.12	1.93	6.7118E+005	1.76E+004	2.0599E+005
		391.69	64.90	1.7646E+004		-6.5727E+003
	CS-134	475.35	1.46	8.4865E+005	1.65E+004	5.4316E+005
		563.23	8.38	1.6222E+005		-5.1693E+004
		569.32	15.43	8.3084E+004		-4.9441E+004
		604.70	97.60	1.6517E+004		1.7104E+004
		795.84	85.40	1.7695E+004		-5.4024E+003
		801.93	8.73	1.6592E+005		-5.7610E+004
		1038.57	1.00	1.3333E+006		-2.6727E+005
		1167.94	1.80	9.6286E+005		-6.8207E+004
		1365.15	3.04	4.3610E+005		3.3869E+005
	CS-136	66.91	12.50	3.1629E+005	1.27E+004	-1.1423E+004
		86.29	6.30	3.6554E+005		6.5741E+004
		153.22	7.46	1.8638E+005		8.7047E+004
		163.89	4.61	3.0000E+005		1.3971E+005
		176.55	13.56	9.9218E+004		-1.4501E+004
		273.65	12.66	9.0175E+004		1.2556E+004
		340.57	48.50	2.5149E+004		2.8765E+004



Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
CS-136	818.50	99.70	1.2660E+004	1.27E+004	-2.2580E+003
	1048.07	79.60	1.7145E+004		1.7219E+004
	1235.34	19.70	9.7558E+004		-4.7715E+004
CS-137	661.65	85.12	1.9617E+004	1.96E+004	1.5660E+004
CS-138	138.10	1.49	1.1619E+006	1.69E+004	-3.1256E+005
	227.76	1.51	9.3665E+005		1.5830E+005
	408.98	4.66	2.9645E+005		1.3690E+005
	462.79	30.70	4.4483E+004		-1.4340E+004
	546.94	10.80	1.2953E+005		-6.5228E+004
	871.80	5.11	3.2561E+005		-2.1352E+004
	1009.78	29.80	5.4542E+004		2.2387E+004
	1147.22	1.24	1.4071E+006		8.4835E+005
	1343.59	1.14	1.2322E+006		-3.4285E+005
	1435.86	76.30	1.6883E+004		3.0041E+003
CE-139	165.85	80.35	1.6878E+004	1.69E+004	-7.3308E+003
EU-152	121.78	28.40	5.4849E+004	4.18E+004	-5.2756E+004
	244.69	7.49	1.7888E+005		-3.1233E+004
	344.27	26.50	4.1775E+004		-5.2643E+004
	411.11	2.21	5.5769E+005		8.2059E+004
	443.98	3.11	3.8170E+005		-3.9497E+005
	778.89	12.74	1.0804E+005		-8.0747E+004
	867.32	4.16	3.5998E+005		2.6163E+005
	964.01	14.40	1.1064E+005		1.0519E+005
	1085.78	10.00	1.5711E+005		-9.5288E+004
	1112.02	13.30	1.1846E+005		-3.0011E+004
	1407.95	20.70	5.2057E+004		-8.3677E+003
EU-154	123.07	40.40	3.8969E+004	3.90E+004	1.0146E+004
	188.25	0.23	5.4794E+006		-1.3935E+006
	247.93	6.83	1.9268E+005		4.4034E+004
	401.30	0.19	6.0729E+006		1.4003E+006
	444.39	0.55	2.2279E+006		1.1201E+006
	478.26	0.21	5.5680E+006		1.9845E+005
	557.56	0.25	5.1834E+006		1.0638E+006
	582.00	0.89	1.7081E+006		3.5915E+005
	591.76	4.91	2.5297E+005		1.9884E+005
	625.22	0.32	4.2349E+006		1.9230E+006
	676.59	0.14	9.6625E+006		-9.4713E+006
	692.42	1.78	7.5025E+005		1.9951E+005
	715.76	0.17	7.5583E+006		-1.4321E+006
	722.30	20.00	6.9401E+004		-2.7443E+004
	756.86	4.50	3.1548E+005		5.2340E+004
	815.55	0.50	2.7484E+006		2.5553E+006
	845.39	0.58	2.2549E+006		2.2284E+005
	850.64	0.23	5.5553E+006		-2.4761E+006
	873.20	12.09	1.1912E+005		-4.2121E+004
	892.73	0.50	2.2549E+006		2.5175E+005
	904.05	0.85	1.8126E+006		-4.4885E+005
	996.30	10.34	1.3966E+005		-8.2028E+004
	1004.76	17.90	8.1138E+004		-3.2578E+004
	1128.40	0.29	5.8003E+006		-2.4794E+006

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
EU-154	1140.90	0.22	7.6990E+006	3.90E+004	2.7918E+006
	1241.60	0.13	1.5457E+007		4.0234E+006
	1246.60	0.80	2.2091E+006		-1.7094E+006
	1274.51	34.40	5.2142E+004		1.8974E+003
	1494.08	0.71	1.5926E+006		1.2571E+005
	1596.45	1.80	6.3035E+005		2.1540E+005
HG-203	279.19	77.30	1.4612E+004	1.46E+004	5.5866E+003
BI-214	609.31	46.30	3.4625E+004	3.46E+004	4.3134E+004
	768.36	5.04	2.9795E+005		-1.0758E+003
	806.17	1.23	1.1819E+006		1.1379E+005
	934.06	3.21	5.2543E+005		3.5782E+005
	1120.29	15.10	1.2628E+005		8.0434E+004
	1155.19	1.69	9.8149E+005		2.2213E+005
	1238.11	5.94	3.3693E+005		7.6510E+003
	1280.96	1.47	9.8789E+005		-1.1030E+006
	1377.67	4.11	3.0729E+005		-9.8347E+004
	1385.31	0.78	1.5773E+006		-1.9603E+004
	1401.50	1.39	8.6399E+005		1.9957E+005
	1407.98	2.48	4.3451E+005		-6.9844E+004
	1509.19	2.19	4.2005E+005		-6.9497E+004
	1661.28	1.15	9.6835E+005		-3.8146E+003
	1729.60	3.05	4.7736E+005		3.3224E+005
	1764.49	15.80	1.0182E+005		8.1400E+003
	1847.44	2.12	5.0634E+005		2.1542E+005
	2118.54	1.21	0.0000E+000		0.0000E+000
	74.81	6.33	4.9495E+005	3.37E+004	1.4993E+005
	77.11	10.70	2.6447E+005		-7.4990E+004
	87.20	3.70	6.0396E+005		-1.4588E+004
	89.80	1.03	2.0455E+006		-1.0689E+006
	241.98	7.49	1.8630E+005		1.2132E+004
	295.21	19.20	6.7754E+004		-1.0811E+004
	351.92	37.20	3.3704E+004		1.7936E+004
	785.91	1.10	1.3865E+006		-4.0746E+005

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or has not been calculated

@ = Half-life too short to be able to perform the decay correction

\*\*\*\*\*  
 \*\*\* G A M M A     S E C T R U M     A N A L Y I S     \*\*\*  
 \*\*\*\*\*

Filename: C:\GENIE2K\CAMFILES\9.16.17\WGTV-06 09162017.CNF

Report Generated On : 9/16/2017 2:05:32 PM  
 Sample Title : WGTV-06 09/16/2017 ✓  
 Sample Description :  
 Sample Identification :  
 Sample Type :  
 Sample Geometry : 3 m - 90d ✓  
 Peak Locate Threshold : 3.00  
 Peak Locate Range (in channels) : 1 - 65535  
 Peak Area Range (in channels) : 200 - 8000  
 Identification Energy Tolerance : 1.000 keV  
 Sample Size : 2.830E+001 m2 ✓  
 Sample Taken On : 9/16/2017 8:55:00 AM  
 Acquisition Started : 9/16/2017 9:00:50 AM ✓  
 Live Time : 600.0 seconds  
 Real Time : 600.2 seconds  
 Dead Time : 0.04 % ✓

Energy Calibration Used Done On : 10/12/2016  
 Efficiency Calibration Used Done On : 12/16/2016  
 Efficiency ID : ULAR\_\_PLANE\_90D\_

*Reviewed*  
*Jan 2018*  
*10/2/17*

\*\*\*\*\*  
\*\*\* P E A K A N A L Y S I S R E P O R T \*\*\*\*\*  
\*\*\*\*\*

Detector Name: 3844

Sample Title: WGTV-06 09/16/2017

Peak Analysis Performed on: 9/16/2017 2:05:32 PM

Peak Analysis From Channel: 200

Peak Analysis To Channel: 8000

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	5839-	5855	5845.72	1461.16	0.60	6.55E+001	38.95	1.04E+002

= First peak in a multiplet region

= Other peak in a multiplet region

= Fitted singlet

Errors quoted at 1.960 sigma

\*\*\*\*\*  
\*\*\* N U C L I D E I D E N T I F I C A T I O N R E P O R T \*\*\*  
\*\*\*\*\*

Sample Title: WGTV-06 09/16/2017  
Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/m2 )	Activity Uncertainty
K-40	0.981	1460.81*	10.67	3.90792E+005	2.34459E+005

\* = Energy line found in the spectrum.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.960 sigma

\*\*\*\*\*  
 \*\*\* I N T E R F E R E N C E C O R R E C T E D R E P O R T \*\*\*  
 \*\*\*\*\*

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/m2 )	Wt mean Activity Uncertainty
K-40	0.981	3.907923E+005	2.344592E+005

? = Nuclide is part of an undetermined solution

X = Nuclide rejected by the interference analysis

@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

\*\*\*\*\* U N I D E N T I F I E D P E A K S \*\*\*\*\*

Peak Locate Performed on: 9/16/2017 2:05:32 PM  
 Peak Locate From Channel: 200  
 Peak Locate To Channel: 8000

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
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All peaks were identified.

\*\*\*\*\*  
\*\*\* N U C L I D E M D A R E P O R T \*\*\*  
\*\*\*\*\*

Detector Name: 3844  
Sample Geometry:  
Sample Title: WGTV-06 09/16/2017  
Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
+	K-40	1460.81*	10.67	3.7228E+005	3.72E+005	3.9079E+005
	SC-46	889.25	99.98	1.5238E+004	1.52E+004	2.3522E+003
		1120.51	99.99	1.8901E+004		4.6447E+003
	CO-57	122.06	85.51	2.0808E+004	2.08E+004	-5.5751E+002
		136.48	10.60	1.4694E+005		1.9547E+003
	CO-60	1173.22	100.00	1.7384E+004	1.27E+004	-3.0102E+003
		1332.49	100.00	1.2703E+004		-7.4490E+003
	SE-75	96.73	3.41	5.7507E+005	2.29E+004	-6.3357E+004
		121.11	16.70	1.0643E+005		-3.1430E+004
		136.00	59.20	2.6414E+004		-6.4854E+003
		198.60	1.45	8.9855E+005		-3.9307E+004
		264.65	59.80	2.2914E+004		8.6413E+003
		279.53	25.20	5.2110E+004		9.2269E+003
		303.91	1.32	1.0152E+006		8.3176E+005
		400.65	11.40	1.0835E+005		-1.9180E+004
	KR-85	513.99	0.43	3.7515E+006	3.75E+006	-1.5804E+006
	KR-85M	151.18	75.30	1.9802E+004	1.98E+004	-1.8354E+003
		304.87	14.00	9.4633E+004		-1.3272E+004
	SR-85	513.99	99.27	1.6251E+004	1.63E+004	-6.8463E+003
	Y-88	898.02	93.40	1.5538E+004	9.16E+003	-7.0179E+003
		1836.01	99.38	9.1566E+003		-3.8116E+002
	CD-109	88.03	3.72	6.6149E+005	6.61E+005	4.8295E+005
	SN-113	255.12	1.93	6.5419E+005	2.00E+004	-2.8054E+005
		391.69	64.90	2.0006E+004		-2.8468E+003
	CS-134	475.35	1.46	9.2748E+005	1.80E+004	-3.9569E+005
		563.23	8.38	1.6662E+005		4.5996E+004
		569.32	15.43	9.0576E+004		9.0022E+003
		604.70	97.60	1.8273E+004		1.4461E+004
		795.84	85.40	1.8013E+004		1.0418E+004
		801.93	8.73	1.7558E+005		8.6700E+004
		1038.57	1.00	1.5051E+006		4.8815E+005
		1167.94	1.80	1.0893E+006		9.0809E+005
		1365.15	3.04	5.3557E+005		2.5401E+005
	CS-136	66.91	12.50	3.2855E+005	1.37E+004	1.7747E+005
		86.29	6.30	3.9739E+005		3.4405E+005
		153.22	7.46	1.9236E+005		-7.3144E+004
		163.89	4.61	2.9448E+005		3.2217E+004
		176.55	13.56	9.8737E+004		-9.0390E+003
		273.65	12.66	1.0366E+005		-6.6892E+004
		340.57	48.50	2.7224E+004		2.1271E+004

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
CS-136	818.50	99.70	1.3664E+004	1.37E+004	8.9015E+003
	1048.07	79.60	1.7148E+004		8.7708E+003
	1235.34	19.70	1.0705E+005		-2.8768E+002
CS-137	661.65	85.12	3.3434E+004	3.34E+004	9.0317E+004
CS-138	138.10	1.49	1.2914E+006	2.27E+004	6.6801E+005
	227.76	1.51	1.1448E+006		6.0988E+005
	408.98	4.66	3.4077E+005		7.6043E+004
	462.79	30.70	5.7953E+004		-2.5912E+004
	546.94	10.80	1.4888E+005		8.4613E+004
	871.80	5.11	3.7452E+005		-5.1161E+004
	1009.78	29.80	6.2473E+004		-1.0408E+004
	1147.22	1.24	1.3711E+006		-2.1665E+006
	1343.59	1.14	1.4871E+006		-8.9438E+005
	1435.86	76.30	2.2706E+004		1.0724E+004
CE-139	165.85	80.35	1.6660E+004	1.67E+004	1.3682E+003
EU-152	121.78	28.40	6.2708E+004	5.04E+004	3.0462E+003
	244.69	7.49	1.7321E+005		9.6731E+003
	344.27	26.50	5.0370E+004		8.9717E+003
	411.11	2.21	5.7511E+005		3.2376E+005
	443.98	3.11	4.4883E+005		-2.6797E+005
	778.89	12.74	1.2405E+005		9.3932E+003
	867.32	4.16	3.8183E+005		1.2600E+005
	964.01	14.40	1.2704E+005		3.9684E+004
	1085.78	10.00	1.6699E+005		6.4961E+004
	1112.02	13.30	1.2758E+005		-4.9629E+003
	1407.95	20.70	5.6254E+004		1.3324E+004
EU-154	123.07	40.40	4.3618E+004	3.77E+004	9.3947E+003
	188.25	0.23	6.0700E+006		5.6467E+006
	247.93	6.83	1.8437E+005		-5.6630E+004
	401.30	0.19	6.4395E+006		2.3567E+005
	444.39	0.55	2.4925E+006		-9.0136E+005
	478.26	0.21	6.6833E+006		6.7430E+006
	557.56	0.25	4.8761E+006		8.2587E+005
	582.00	0.89	1.8202E+006		2.0959E+006
	591.76	4.91	2.6823E+005		-7.5180E+004
	625.22	0.32	4.5018E+006		2.7338E+006
	676.59	0.14	8.5747E+006		3.6473E+006
	692.42	1.78	7.4300E+005		6.9669E+003
	715.76	0.17	8.4138E+006		6.5556E+006
	722.30	20.00	7.5038E+004		9.0060E+003
	756.86	4.50	3.0309E+005		-2.1377E+005
	815.55	0.50	2.8105E+006		1.9346E+004
	845.39	0.58	2.4005E+006		5.6681E+004
	850.64	0.23	6.2199E+006		-5.0999E+005
	873.20	12.09	1.2047E+005		-1.0827E+004
	892.73	0.50	3.1496E+006		1.2390E+005
	904.05	0.85	1.8867E+006		-2.9057E+006
	996.30	10.34	1.5761E+005		-1.0317E+004
	1004.76	17.90	8.6523E+004		1.3620E+004
	1128.40	0.29	5.8003E+006		-6.7778E+006



Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
EU-154	1140.90	0.22	7.6990E+006	3.77E+004	5.9482E+006
	1241.60	0.13	1.5457E+007		-1.6182E+006
	1246.60	0.80	2.1539E+006		5.1907E+004
	1274.51	34.40	3.7745E+004		-6.1424E+003
	1494.08	0.71	1.6582E+006		2.1194E+005
	1596.45	1.80	6.8608E+005		4.1609E+005
HG-203	279.19	77.30	1.7069E+004	1.71E+004	9.5660E+003
BI-214	609.31	46.30	3.7001E+004	3.70E+004	8.8650E+003
	768.36	5.04	3.1560E+005		8.9599E+004
	806.17	1.23	1.1458E+006		1.5843E+005
	934.06	3.21	4.2443E+005		-3.7675E+005
	1120.29	15.10	1.2513E+005		3.0751E+004
	1155.19	1.69	8.8981E+005		-3.9263E+005
	1238.11	5.94	3.3693E+005		9.2397E+004
	1280.96	1.47	1.0436E+006		4.6394E+005
	1377.67	4.11	4.1795E+005		2.2239E+004
	1385.31	0.78	2.1769E+006		1.1153E+006
	1401.50	1.39	1.0194E+006		4.5866E+005
	1407.98	2.48	4.6954E+005		1.1121E+005
	1509.19	2.19	4.7256E+005		5.6777E+004
	1661.28	1.15	8.6074E+005		3.6620E+005
	1729.60	3.05	2.5546E+005		-2.9071E+005
	1764.49	15.80	1.0937E+005		5.6457E+004
	1847.44	2.12	5.6964E+005		2.8723E+005
	2118.54	1.21	0.0000E+000		0.0000E+000
	74.81	6.33	5.3179E+005	4.03E+004	3.7289E+005
	77.11	10.70	2.8775E+005		3.1284E+005
	87.20	3.70	6.7086E+005		1.9964E+005
	89.80	1.03	2.3050E+006		7.6692E+005
	241.98	7.49	1.8440E+005		3.1854E+004
	295.21	19.20	7.1592E+004		-7.5666E+002
	351.92	37.20	4.0273E+004		3.7191E+004
	785.91	1.10	1.3116E+006		-3.4476E+005

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or has not been calculated

@ = Half-life too short to be able to perform the decay correction

Filename: C:\GENIE2K\CAMFILES\9.16.17\WGTV-05 9.16.17.CNF

Report Generated On : 9/16/2017 2:06:27 PM

Sample Title : WGTV-05 09/16/2017 ✓  
 Sample Description :  
 Sample Identification :  
 Sample Type :  
 Sample Geometry : 3m\_90d ✓

Peak Locate Threshold : 3.00  
 Peak Locate Range (in channels) : 1 - 65535  
 Peak Area Range (in channels) : 200 - 8000  
 Identification Energy Tolerance : 1.000 keV

Sample Size : 2.830E+001 m2 ✓

Sample Taken On : 9/16/2017 9:20:00 AM  
 Acquisition Started : 9/16/2017 9:21:16 AM

Live Time : 600.0 seconds ✓  
 Real Time : 600.2 seconds

Dead Time : 0.04 % ✓

Energy Calibration Used Done On : 10/12/2016  
 Efficiency Calibration Used Done On : 12/16/2016  
 Efficiency ID : ULAR\_\_PLANE\_90D\_ /

*revised  
 Joe O. Jacobs  
 10/24/17*

\*\*\*\*\*  
\*\*\* P E A K A N A L Y S I S R E P O R T \*\*\*\*\*  
\*\*\*\*\*

Detector Name: 3844

Sample Title: WGTV-05 09/16/2017

Peak Analysis Performed on: 9/16/2017 2:06:27 PM

Peak Analysis From Channel: 200

Peak Analysis To Channel: 8000

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	1564-	1574	1568.71	392.27	0.61	1.82E+001	16.25	2.08E+001
2	5836-	5860	5844.22	1460.79	0.89	1.43E+002	38.28	5.77E+001

= First peak in a multiplet region

= Other peak in a multiplet region

= Fitted singlet

Errors quoted at 1.960 sigma

\*\*\*\*\*  
 \*\*\* N U C L I D E I D E N T I F I C A T I O N R E P O R T \*\*\*  
 \*\*\*\*\*

Sample Title: WGTV-05 09/16/2017  
 Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/m2 )	Activity Uncertainty
K-40	1.000	1460.81*	10.67	8.54376E+005	2.38489E+005
SN-113	0.948	255.12	1.93		
		391.69*	64.90	7.15466E+003	6.42740E+003

\* = Energy line found in the spectrum.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.960 sigma

*Handwritten notes:*  
 Likely Bi-214  
 5.12 not in ROS of 1460.81  
 115 days = T<sub>1/2</sub>  
 Joe O'J...  
 11/2/17

\*\*\*\*\*  
 \*\*\* I N T E R F E R E N C E C O R R E C T E D R E P O R T \*\*\*  
 \*\*\*\*\*

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/m2 )	Wt mean Activity Uncertainty
K-40	1.000	8.543765E+005	2.384890E+005
SN-113	0.948	7.154658E+003	6.427399E+003

? = Nuclide is part of an undetermined solution

X = Nuclide rejected by the interference analysis

@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

\*\*\*\*\* U N I D E N T I F I E D P E A K S \*\*\*\*\*

Peak Locate Performed on: 9/16/2017 2:06:27 PM  
 Peak Locate From Channel: 200  
 Peak Locate To Channel: 8000

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
-------------	-----------------	-----------------------------------	---------------------------	--------------	-----------------

All peaks were identified.

\*\*\*\*\*  
\*\*\* N U C L I D E M D A R E P O R T \*\*\*  
\*\*\*\*\*

Detector Name: 3844  
Sample Geometry:  
Sample Title: WGTV-05 09/16/2017  
Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
+	K-40	1460.81*	10.67	3.1884E+005	3.19E+005	8.5438E+005
	SC-46	889.25	99.98	1.2202E+004	1.22E+004	-1.2416E+004
		1120.51	99.99	1.6661E+004		-1.6295E+004
	CO-57	122.06	85.51	2.0981E+004	2.10E+004	-4.9614E+003
		136.48	10.60	1.4749E+005		1.9205E+004
	CO-60	1173.22	100.00	1.7179E+004	1.20E+004	9.5562E+003
		1332.49	100.00	1.1987E+004		-8.6409E+003
	SE-75	96.73	3.41	6.0397E+005	2.14E+004	1.0806E+005
		121.11	16.70	1.0855E+005		-1.3793E+004
		136.00	59.20	2.7063E+004		2.5249E+004
		198.60	1.45	9.9596E+005		4.6378E+005
		264.65	59.80	2.1370E+004		-5.6705E+003
		279.53	25.20	5.2667E+004		5.6108E+003
		303.91	1.32	9.5246E+005		-7.9159E+004
		400.65	11.40	1.1979E+005		6.5374E+004
	KR-85	513.99	0.43	3.7988E+006	3.80E+006	3.0878E+006
	KR-85M	151.18	75.30	1.8737E+004	1.87E+004	-2.4517E+003
		304.87	14.00	8.9064E+004		-2.2823E+004
	SR-85	513.99	99.27	1.6456E+004	1.65E+004	1.3376E+004
	Y-88	898.02	93.40	1.4199E+004	8.21E+003	-2.8968E+003
		1836.01	99.38	8.2060E+003		2.2869E+003
	CD-109	88.03	3.72	6.4245E+005	6.42E+005	1.2765E+005
+	SN-113	255.12	1.93	7.3204E+005	1.03E+004	7.3514E+005
		391.69*	64.90	1.0282E+004		7.1547E+003
	CS-134	475.35	1.46	8.8637E+005	1.75E+004	-3.6586E+005
		563.23	8.38	1.4943E+005		-1.3411E+005
		569.32	15.43	8.3084E+004		-4.0384E+003
		604.70	97.60	1.7460E+004		2.5825E+003
		795.84	85.40	1.8325E+004		5.0431E+003
		801.93	8.73	1.7713E+005		1.3301E+005
		1038.57	1.00	1.5251E+006		-7.8373E+005
		1167.94	1.80	9.8516E+005		5.9815E+005
		1365.15	3.04	4.2469E+005		3.1876E+005
	CS-136	66.91	12.50	3.3295E+005	1.56E+004	-2.0183E+005
		86.29	6.30	3.8557E+005		1.5951E+005
		153.22	7.46	1.8666E+005		-2.7728E+004
		163.89	4.61	2.9954E+005		-2.0060E+005
		176.55	13.56	1.0486E+005		-2.2035E+004
		273.65	12.66	1.0088E+005		-7.6961E+004
		340.57	48.50	2.7030E+004		1.9223E+002

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
CS-136	818.50	99.70	1.5595E+004	1.56E+004	2.9942E+003
	1048.07	79.60	1.7145E+004		1.2531E+004
	1235.34	19.70	9.9533E+004		3.9320E+004
CS-137	661.65	85.12	3.4435E+004	3.44E+004	9.9823E+004
CS-138	138.10	1.49	1.1752E+006	2.06E+004	-7.2171E+005
	227.76	1.51	9.7264E+005		-7.4568E+005
	408.98	4.66	3.3130E+005		-1.5407E+005
	462.79	30.70	5.7547E+004		4.4226E+004
	546.94	10.80	1.3797E+005		-4.7170E+004
	871.80	5.11	3.0261E+005		-1.3234E+005
	1009.78	29.80	6.4380E+004		4.8181E+004
	1147.22	1.24	1.4214E+006		-1.5665E+006
	1343.59	1.14	1.5026E+006		9.3545E+005
	1435.86	76.30	2.0583E+004		8.4075E+003
CE-139	165.85	80.35	1.7225E+004	1.72E+004	-1.1839E+004
EU-152	121.78	28.40	6.2839E+004	4.75E+004	-5.8392E+004
	244.69	7.49	1.8360E+005		1.5286E+003
	344.27	26.50	4.7502E+004		-7.3392E+004
	411.11	2.21	6.1904E+005		3.8814E+004
	443.98	3.11	4.4260E+005		-5.4793E+004
	778.89	12.74	1.0804E+005		-1.9952E+005
	867.32	4.16	2.9304E+005		-1.1490E+003
	964.01	14.40	1.2602E+005		3.8145E+004
	1085.78	10.00	1.4650E+005		-2.2520E+004
	1112.02	13.30	1.2903E+005		-1.7431E+003
EU-154	1407.95	20.70	6.3705E+004	4.37E+004	-1.3915E+004
	123.07	40.40	4.3665E+004		-1.6325E+004
	188.25	0.23	6.1830E+006		1.4463E+006
	247.93	6.83	2.0150E+005		-2.5562E+004
	401.30	0.19	7.0839E+006		4.6251E+006
	444.39	0.55	2.4806E+006		-1.3098E+006
	478.26	0.21	6.2262E+006		-1.3161E+006
	557.56	0.25	4.9937E+006		-2.4574E+006
	582.00	0.89	1.7368E+006		1.0951E+006
	591.76	4.91	2.5521E+005		-2.4127E+005
	625.22	0.32	4.3705E+006		-2.9846E+006
	676.59	0.14	9.9368E+006		9.2219E+006
	692.42	1.78	7.2078E+005		-3.6087E+005
	715.76	0.17	7.9596E+006		-1.9197E+006
	722.30	20.00	7.9690E+004		7.0134E+004
	756.86	4.50	3.1850E+005		-2.6027E+004
	815.55	0.50	3.1012E+006		6.4190E+005
	845.39	0.58	2.4833E+006		1.8201E+006
	850.64	0.23	6.4916E+006		5.4228E+005
	873.20	12.09	1.2181E+005		1.0843E+005
	892.73	0.50	2.5120E+006		-1.5545E+006
	904.05	0.85	1.7548E+006		-6.4632E+005
	996.30	10.34	1.5928E+005		9.6460E+004
	1004.76	17.90	8.7556E+004		-4.9619E+004
	1128.40	0.29	5.6625E+006		-7.7611E+005

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
EU-154	1140.90	0.22	7.8817E+006	4.37E+004	8.1236E+006
	1241.60	0.13	1.4824E+007		9.8149E+006
	1246.60	0.80	2.1539E+006		-4.1118E+005
	1274.51	34.40	4.5205E+004		4.5402E+004
	1494.08	0.71	1.3728E+006		-1.2342E+006
	1596.45	1.80	6.3035E+005		1.6076E+005
	279.19	77.30	1.7294E+004	1.73E+004	8.1171E+003
HG-203	279.19	77.30	1.7294E+004		8.1171E+003
BI-214	609.31	46.30	3.6646E+004	3.66E+004	-4.5794E+003
	768.36	5.04	3.0054E+005		4.8118E+004
	806.17	1.23	1.2618E+006		-5.9389E+004
	934.06	3.21	4.4777E+005		-1.1698E+005
	1120.29	15.10	1.1031E+005		-1.0788E+005
	1155.19	1.69	8.7584E+005		-4.0751E+005
	1238.11	5.94	3.0692E+005		-1.4029E+005
	1280.96	1.47	1.0068E+006		3.8497E+005
	1377.67	4.11	3.4081E+005		-3.0433E+004
	1385.31	0.78	1.9995E+006		-4.4107E+005
	1401.50	1.39	8.9207E+005		1.1087E+004
	1407.98	2.48	5.3174E+005		-1.1615E+005
	1509.19	2.19	4.4725E+005		-2.1594E+005
	1661.28	1.15	1.1489E+006		7.3239E+005
	1729.60	3.05	3.7652E+005		1.8985E+005
	1764.49	15.80	8.7557E+004		5.5817E+004
	1847.44	2.12	2.6420E+005		3.5903E+004
	2118.54	1.21	0.0000E+000		0.0000E+000
	74.81	6.33	5.3010E+005	3.97E+004	1.3480E+004
	77.11	10.70	2.9305E+005		4.0338E+005
	87.20	3.70	6.5001E+005		-9.3247E+004
	89.80	1.03	2.2447E+006		-1.4618E+006
	241.98	7.49	1.9260E+005		2.0106E+005
	295.21	19.20	6.9892E+004		-4.2032E+003
	351.92	37.20	3.9702E+004		1.9279E+004
	785.91	1.10	1.3620E+006		2.2129E+005

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or has not been calculated

@ = Half-life too short to be able to perform the decay correction



\*\*\*\*\*  
 \*\*\* G A M M A S E C T R U M A N A L Y I S \*\*\*\*\*  
 \*\*\*\*\*

Filename: C:\GENIE2K\CAMFILES\9.16.17\WGTV 04 9.16.17.CNF

Report Generated On : 9/16/2017 2:07:23 PM  
 Sample Title : WGTV-04 09/16/2017 ✓  
 Sample Description :  
 Sample Identification :  
 Sample Type :  
 Sample Geometry : 3 m - 90 d ✓  
 Peak Locate Threshold : 3.00  
 Peak Locate Range (in channels) : 1 - 65535  
 Peak Area Range (in channels) : 200 - 8000  
 Identification Energy Tolerance : 1.000 keV  
 Sample Size : 2.830E+001 m2 ✓  
 Sample Taken On : 9/16/2017 9:35:00 AM  
 Acquisition Started : 9/16/2017 9:35:46 AM  
 Live Time : 600.0 seconds ✓  
 Real Time : 600.3 seconds  
 Dead Time : 0.04 %

Energy Calibration Used Done On : 10/12/2016  
 Efficiency Calibration Used Done On / : 12/16/2016  
 Efficiency ID : ULAR\_\_PLANE\_90D\_

*Review  
 J. O. Jones  
 10/2/17*

\*\*\*\*\*  
\*\*\* P E A K A N A L Y S I S R E P O R T \*\*\*\*\*  
\*\*\*\*\*

Detector Name: 3844

Sample Title: WGTV-04 09/16/2017

Peak Analysis Performed on: 9/16/2017 2:07:23 PM

Peak Analysis From Channel: 200

Peak Analysis To Channel: 8000

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	2634-	2660	2647.49	662.03	1.20	2.78E+002	53.95	1.10E+002

= First peak in a multiplet region

= Other peak in a multiplet region

= Fitted singlet

Errors quoted at 1.960 sigma

\*\*\*\*\*  
 \*\*\* N U C L I D E I D E N T I F I C A T I O N R E P O R T \*\*\*  
 \*\*\*\*\*

Sample Title: WGTV-04 09/16/2017  
 Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/m2 )	Activity Uncertainty
CS-137	0.977	661.65*	85.12	1.21020E+005	2.53326E+004

\* = Energy line found in the spectrum.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.960 sigma

\*\*\*\*\*  
\*\*\* I N T E R F E R E N C E C O R R E C T E D R E P O R T \*\*\*  
\*\*\*\*\*

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/m2 )	Wt mean Activity Uncertainty
CS-137	0.977	1.210196E+005	2.533263E+004

? = Nuclide is part of an undetermined solution

X = Nuclide rejected by the interference analysis

@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

\*\*\*\*\* U N I D E N T I F I E D P E A K S \*\*\*\*\*

Peak Locate Performed on: 9/16/2017 2:07:23 PM  
Peak Locate From Channel: 200  
Peak Locate To Channel: 8000

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
-------------	-----------------	-----------------------------------	---------------------------	--------------	-----------------

All peaks were identified.

\*\*\*\*\*  
\*\*\* N U C L I D E M D A R E P O R T \*\*\*\*\*  
\*\*\*\*\*

Detector Name: 3844  
Sample Geometry:  
Sample Title: WGTV-04 09/16/2017  
Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
K-40	1460.81	10.67	4.6949E+005	4.69E+005	1.5506E+006
SC-46	889.25	99.98	1.3900E+004	1.39E+004	-1.3239E+003
	1120.51	99.99	1.9416E+004		-2.6393E+004
CO-57	122.06	85.51	2.0412E+004	2.04E+004	1.1452E+003
	136.48	10.60	1.4949E+005		-4.1595E+004
CO-60	1173.22	100.00	1.8372E+004	1.65E+004	-8.8439E+003
	1332.49	100.00	1.6544E+004		8.7898E+003
SE-75	96.73	3.41	5.9656E+005	2.11E+004	2.3512E+005
	121.11	16.70	1.0323E+005		-1.3628E+005
	136.00	59.20	2.6805E+004		-1.5798E+004
	198.60	1.45	1.0199E+006		3.9115E+005
	264.65	59.80	2.1140E+004		-1.3180E+004
	279.53	25.20	5.5763E+004		-2.0726E+004
	303.91	1.32	1.0409E+006		4.4656E+005
	400.65	11.40	1.1265E+005		-1.3424E+005
KR-85	513.99	0.43	3.9970E+006	4.00E+006	3.1632E+006
KR-85M	151.18	75.30	2.0915E+004	2.09E+004	-1.1472E+004
	304.87	14.00	9.9568E+004		4.2382E+004
SR-85	513.99	99.27	1.7314E+004	1.73E+004	1.3702E+004
Y-88	898.02	93.40	1.5537E+004	1.08E+004	-3.7629E+001
	1836.01	99.38	1.0751E+004		-7.0513E+003
CD-109	88.03	3.72	6.5898E+005	6.59E+005	3.2191E+005
SN-113	255.12	1.93	6.8610E+005	2.14E+004	4.9874E+005
	391.69	64.90	2.1373E+004		1.8242E+004
CS-134	475.35	1.46	1.0044E+006	1.69E+004	1.1668E+006
	563.23	8.38	1.6333E+005		-7.8548E+004
	569.32	15.43	7.7657E+004		-4.7513E+004
	604.70	97.60	1.8820E+004		1.2631E+004
	795.84	85.40	1.6872E+004		5.8076E+002
	801.93	8.73	1.6757E+005		-6.1768E+004
	1038.57	1.00	1.5834E+006		2.3962E+005
	1167.94	1.80	1.0282E+006		-7.6493E+005
	1365.15	3.04	4.1292E+005		5.3127E+004
CS-136	66.91	12.50	3.5666E+005	1.52E+004	1.7062E+005
	86.29	6.30	3.9924E+005		-3.7999E+004
	153.22	7.46	2.1105E+005		1.6087E+005
	163.89	4.61	3.0771E+005		8.6137E+004
	176.55	13.56	1.0216E+005		-1.0961E+005
	273.65	12.66	1.0792E+005		1.1444E+004
	340.57	48.50	3.0343E+004		1.1880E+004

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
+	CS-136	818.50	99.70	1.5172E+004	1.52E+004	1.8126E+003
		1048.07	79.60	1.8247E+004		-6.3210E+003
		1235.34	19.70	9.1359E+004		-4.6021E+004
	CS-137	661.65*	85.12	3.2535E+004	3.25E+004	1.2102E+005
	CS-138	138.10	1.49	1.2122E+006	1.93E+004	2.3728E+005
		227.76	1.51	1.0526E+006		-1.3727E+006
		408.98	4.66	3.4172E+005		2.2719E+005
		462.79	30.70	5.6483E+004		3.5704E+004
		546.94	10.80	1.3845E+005		-3.5195E+004
		871.80	5.11	3.1085E+005		-6.5610E+004
		1009.78	29.80	5.1318E+004		2.8170E+003
		1147.22	1.24	1.5794E+006		-6.4081E+005
		1343.59	1.14	1.4867E+006		9.0163E+005
		1435.86	76.30	1.9282E+004		4.9152E+003
	CE-139	165.85	80.35	1.7514E+004	1.75E+004	-1.7779E+004
	EU-152	121.78	28.40	6.1179E+004	5.26E+004	-3.1826E+004
		244.69	7.49	1.8857E+005		-3.5425E+004
		344.27	26.50	5.2580E+004		-2.6177E+004
		411.11	2.21	6.0296E+005		-2.3237E+005
		443.98	3.11	4.6896E+005		-2.1341E+005
		778.89	12.74	1.1793E+005		5.2135E+004
		867.32	4.16	3.4061E+005		-2.9813E+005
		964.01	14.40	1.0580E+005		-7.0269E+004
		1085.78	10.00	1.5914E+005		5.2546E+004
		1112.02	13.30	1.3328E+005		-1.1031E+004
	EU-154	1407.95	20.70	6.3705E+004	4.36E+004	5.2298E+003
		123.07	40.40	4.3572E+004		-4.1587E+003
		188.25	0.23	6.0318E+006		-2.2174E+006
		247.93	6.83	1.9670E+005		4.6809E+004
		401.30	0.19	6.7851E+006		-5.2377E+006
		444.39	0.55	2.6312E+006		-6.7010E+005
		478.26	0.21	6.5116E+006		2.3943E+003
		557.56	0.25	5.5072E+006		4.7134E+006
		582.00	0.89	1.8648E+006		1.2155E+006
		591.76	4.91	2.5743E+005		-1.8605E+004
		625.22	0.32	4.3033E+006		1.2849E+006
		676.59	0.14	9.5691E+006		1.4812E+006
		692.42	1.78	7.8541E+005		5.1107E+005
		715.76	0.17	7.6404E+006		1.2705E+005
		722.30	20.00	7.6818E+004		-2.8060E+003
		756.86	4.50	3.0309E+005		-1.1379E+005
		815.55	0.50	2.9011E+006		1.1247E+006
		845.39	0.58	2.5370E+006		1.3372E+006
		850.64	0.23	5.8609E+006		-1.4554E+006
		873.20	12.09	1.2181E+005		-3.2127E+004
		892.73	0.50	2.8853E+006		1.0088E+006
		904.05	0.85	1.8685E+006		-4.6312E+006
		996.30	10.34	1.4530E+005		1.1032E+005
		1004.76	17.90	7.6528E+004		-4.5103E+004
		1128.40	0.29	6.4418E+006		3.2414E+006

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
EU-154	1140.90	0.22	6.8096E+006	4.36E+004	-1.3893E+006
	1241.60	0.13	1.3095E+007		-9.6924E+006
	1246.60	0.80	2.0384E+006		-2.6257E+005
	1274.51	34.40	4.5205E+004		-4.0000E+004
	1494.08	0.71	1.3728E+006		-5.7467E+005
	1596.45	1.80	6.8607E+005		-3.5247E+004
HG-203	279.19	77.30	1.8295E+004	1.83E+004	8.5424E+002
BI-214	609.31	46.30	4.0208E+004	4.02E+004	2.6995E+004
	768.36	5.04	3.2523E+005		2.2196E+005
	806.17	1.23	1.2053E+006		-5.9718E+005
	934.06	3.21	4.6444E+005		-6.8331E+004
	1120.29	15.10	1.2855E+005		-1.7474E+005
	1155.19	1.69	1.1091E+006		2.7943E+005
	1238.11	5.94	2.9980E+005		-1.9731E+004
	1280.96	1.47	1.1937E+006		5.7506E+005
	1377.67	4.11	2.8884E+005		-1.8533E+004
	1385.31	0.78	1.7600E+006		2.9404E+005
	1401.50	1.39	9.9545E+005		4.9523E+005
	1407.98	2.48	5.3174E+005		4.3653E+004
	1509.19	2.19	4.7256E+005		-2.1408E+005
	1661.28	1.15	7.3310E+005		-3.2805E+005
	1729.60	3.05	3.7652E+005		1.8985E+005
	1764.49	15.80	9.6406E+004		6.0468E+003
	1847.44	2.12	5.0634E+005		-1.2117E+005
	2118.54	1.21	0.0000E+000		0.0000E+000
	74.81	6.33	5.3010E+005	4.12E+004	5.3989E+004
	77.11	10.70	2.9071E+005		2.0815E+005
	87.20	3.70	6.7214E+005		2.2112E+005
	89.80	1.03	2.2939E+006		-5.3465E+004
	241.98	7.49	2.0184E+005		7.3832E+003
	295.21	19.20	7.0653E+004		1.0938E+004
	351.92	37.20	4.1170E+004		2.1433E+004
	785.91	1.10	1.3116E+006		-6.0887E+004

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or has not been calculated

@ = Half-life too short to be able to perform the decay correction

Filename: 3844

Report Generated On : 9/16/2017 2:10:40 PM

Sample Title : WGTV-03QC 09/16/2017 ✓  
Sample Description :  
Sample Identification :  
Sample Type :  
Sample Geometry : 3m - 90d ✓

Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 1 - 65535  
Peak Area Range (in channels) : 200 - 8000  
Identification Energy Tolerance : 1.000 keV

Sample Size : 2.830E+001 m2 ✓

Sample Taken On : 9/16/2017 2:00:00 PM  
Acquisition Started : 9/16/2017 2:00:40 PM

Live Time : 600.0 seconds ✓  
Dead Time : 600.3 seconds

Lead Time : 0.04 % ✓

Energy Calibration Used Done On : 10/12/2016  
Efficiency Calibration Used Done On : 12/16/2016  
Efficiency ID : ULAR\_\_PLANE\_90D\_

*Reviewed  
Jon D. Jones  
10/2/17*



Peak analysis results available for reporting purposes

\*\*\*\*\*  
 \*\*\*    N U C L I D E    I D E N T I F I C A T I O N    R E P O R T    \*\*\*\*\*  
 \*\*\*\*\*

Sample Title:                    WGTV-03QC 09/16/2017  
 Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide	Id	Energy	Yield	Activity	Activity
Name	Confidence	(keV)	(%)	(pCi/m2 )	Uncertainty

\* = Energy line found in the spectrum.  
 @ = Energy line not used for Weighted Mean Activity  
 Energy Tolerance :      1.000 keV  
 Nuclide confidence index threshold =    0.30  
 Errors quoted at    1.960 sigma

\*\*\*\*\*  
 \*\*\* I N T E R F E R E N C E C O R R E C T E D R E P O R T \*\*\*  
 \*\*\*\*\*

Nuclide	Nuclide Id	Wt mean Activity	Wt mean Activity
Name	Confidence	(pCi/m2 )	Uncertainty

? = Nuclide is part of an undetermined solution  
 X = Nuclide rejected by the interference analysis  
 @ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

peak search results available for nuclide analysis.

\*\*\*\*\*  
\*\*\* N U C L I D E M D A R E P O R T \*\*\*\*\*  
\*\*\*\*\*

Detector Name: 3844  
Sample Geometry:  
Sample Title: WGTV-03QC 09/16/2017  
Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
K-40	1460.81	10.67	4.5570E+005	4.56E+005	1.4568E+006
SC-46	889.25	99.98	1.3900E+004	1.39E+004	-6.2130E+003
	1120.51	99.99	1.6048E+004		-1.0616E+004
CO-57	122.06	85.51	2.0829E+004	2.08E+004	-8.9537E+003
	136.48	10.60	1.5288E+005		1.1057E+005
CO-60	1173.22	100.00	1.6971E+004	1.52E+004	8.9602E+003
	1332.49	100.00	1.5196E+004		-6.7910E+003
SE-75	96.73	3.41	6.4598E+005	2.23E+004	5.3606E+005
	121.11	16.70	1.0898E+005		5.7618E+004
	136.00	59.20	2.7127E+004		1.7313E+004
	198.60	1.45	9.9596E+005		1.0089E+004
	264.65	59.80	2.2265E+004		-2.0625E+002
	279.53	25.20	5.3629E+004		-2.4878E+004
	303.91	1.32	1.0957E+006		-2.1991E+005
	400.65	11.40	1.1729E+005		-1.6987E+005
KR-85	513.99	0.43	3.9672E+006	3.97E+006	1.7874E+006
KR-85M	151.18	75.30	2.0007E+004	2.00E+004	3.0712E+003
	304.87	14.00	1.0300E+005		2.3171E+004
SR-85	513.99	99.27	1.7185E+004	1.72E+004	7.7426E+003
Y-88	898.02	93.40	1.6927E+004	1.08E+004	1.0973E+004
	1836.01	99.38	1.0751E+004		-5.3996E+002
CD-109	88.03	3.72	6.5520E+005	6.55E+005	-9.2124E+004
SN-113	255.12	1.93	7.3815E+005	2.06E+004	1.4394E+005
	391.69	64.90	2.0616E+004		8.6926E+003
CS-134	475.35	1.46	1.0226E+006	1.69E+004	4.5808E+005
	563.23	8.38	1.6877E+005		4.3766E+003
	569.32	15.43	8.9977E+004		5.6961E+003
	604.70	97.60	1.6866E+004		3.4316E+003
	795.84	85.40	1.8782E+004		3.2815E+003
	801.93	8.73	1.8469E+005		-5.8423E+004
	1038.57	1.00	1.6394E+006		3.8512E+005
	1167.94	1.80	9.3998E+005		7.5786E+004
	1365.15	3.04	4.0075E+005		-9.2142E+004
CS-136	66.91	12.50	3.2898E+005	1.52E+004	-2.4420E+005
	86.29	6.30	3.9616E+005		1.3065E+005
	153.22	7.46	1.9757E+005		6.3662E+004
	163.89	4.61	3.1127E+005		1.1065E+005
	176.55	13.56	1.1065E+005		1.4318E+004
	273.65	12.66	1.0766E+005		-1.4907E+004
	340.57	48.50	2.8870E+004		5.8735E+003

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
CS-136	818.50	99.70	1.5172E+004	1.52E+004	-4.4941E+003
	1048.07	79.60	2.1631E+004		1.6047E+004
	1235.34	19.70	9.9531E+004		7.6727E+004
CS-137	661.65	85.12	4.8080E+004	4.81E+004	2.1345E+005
CS-138	138.10	1.49	1.2207E+006	2.49E+004	1.5966E+005
	227.76	1.51	1.0363E+006		-5.4911E+005
	408.98	4.66	3.3264E+005		9.0387E+004
	462.79	30.70	5.4738E+004		-2.7004E+003
	546.94	10.80	1.4651E+005		1.2691E+005
	871.80	5.11	3.1747E+005		-4.5633E+004
	1009.78	29.80	5.8805E+004		-4.8144E+004
	1147.22	1.24	1.4630E+006		-1.0240E+006
	1343.59	1.14	1.6711E+006		9.3363E+005
	1435.86	76.30	2.4950E+004		1.8511E+004
CE-139	165.85	80.35	1.7540E+004	1.75E+004	-1.1485E+004
EU-152	121.78	28.40	6.3296E+004	5.12E+004	-6.3768E+003
	244.69	7.49	2.0026E+005		-1.7624E+005
	344.27	26.50	5.1232E+004		-7.2284E+004
	411.11	2.21	6.3725E+005		4.6025E+005
	443.98	3.11	5.0671E+005		8.4491E+004
	778.89	12.74	9.7044E+004		4.1136E+004
	867.32	4.16	3.5998E+005		-8.1768E+004
	964.01	14.40	1.2704E+005		1.2075E+004
	1085.78	10.00	1.6312E+005		6.1473E+004
	1112.02	13.30	1.1846E+005		-8.3376E+004
	1407.95	20.70	7.7610E+004		3.2126E+004
EU-154	123.07	40.40	4.3803E+004	4.29E+004	-1.3628E+004
	188.25	0.23	6.5187E+006		-8.9016E+005
	247.93	6.83	2.1281E+005		-2.7034E+004
	401.30	0.19	7.0839E+006		-6.6135E+006
	444.39	0.55	2.8773E+006		-3.1935E+005
	478.26	0.21	6.9813E+006		5.0813E+006
	557.56	0.25	5.1834E+006		3.1958E+006
	582.00	0.89	1.7929E+006		7.1391E+005
	591.76	4.91	2.7654E+005		1.0025E+005
	625.22	0.32	4.4037E+006		1.8939E+006
	676.59	0.14	8.7834E+006		-8.7108E+006
	692.42	1.78	7.9224E+005		-2.3221E+005
	715.76	0.17	7.6404E+006		2.7683E+005
	722.30	20.00	6.6730E+004		-1.9751E+004
	756.86	4.50	3.0624E+005		-1.5931E+005
	815.55	0.50	2.8712E+006		-1.7437E+006
	845.39	0.58	2.5894E+006		1.9851E+006
	850.64	0.23	5.7862E+006		3.4505E+006
	873.20	12.09	1.2313E+005		6.4873E+004
	892.73	0.50	3.1179E+006		1.9238E+006
	904.05	0.85	1.9226E+006		6.4905E+005
	996.30	10.34	1.1872E+005		-1.7035E+005
	1004.76	17.90	9.0580E+004		8.0630E+004
	1128.40	0.29	5.5208E+006		-2.5292E+006

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
EU-154	1140.90	0.22	7.9714E+006	4.29E+004	1.6811E+006
	1241.60	0.13	1.4329E+007		1.3534E+006
	1246.60	0.80	1.9468E+006		-1.4122E+005
	1274.51	34.40	4.2880E+004		-7.9174E+003
	1494.08	0.71	1.7811E+006		5.4855E+005
	1596.45	1.80	8.0635E+005		-1.7495E+005
	279.19	77.30	1.7736E+004	1.77E+004	1.6362E+003
HG-203	279.19	77.30	1.7736E+004		1.6362E+003
BI-214	609.31	46.30	3.8386E+004	3.84E+004	4.9889E+004
	768.36	5.04	2.4625E+005		-3.5194E+005
	806.17	1.23	1.2836E+006		-7.4163E+005
	934.06	3.21	4.1221E+005		-5.2056E+005
	1120.29	15.10	1.0625E+005		-7.0287E+004
	1155.19	1.69	9.4340E+005		1.7628E+005
	1238.11	5.94	3.4009E+005		2.2532E+005
	1280.96	1.47	1.1461E+006		1.0216E+006
	1377.67	4.11	3.4862E+005		8.5251E+004
	1385.31	0.78	1.8025E+006		8.6150E+005
	1401.50	1.39	1.0878E+006		-9.2023E+005
	1407.98	2.48	6.4780E+005		2.6815E+005
	1509.19	2.19	3.9047E+005		-2.7551E+005
	1661.28	1.15	8.0014E+005		3.0516E+005
	1729.60	3.05	4.1338E+005		-7.2380E+004
	1764.49	15.80	9.9155E+004		3.8592E+004
	1847.44	2.12	6.5119E+005		3.9494E+005
	2118.54	1.21	0.0000E+000		0.0000E+000
	74.81	6.33	5.4295E+005	3.95E+004	3.9848E+005
	77.11	10.70	2.9364E+005		1.2433E+005
	87.20	3.70	6.6376E+005		5.5255E+004
	89.80	1.03	2.3378E+006		5.3102E+005
	241.98	7.49	2.1429E+005		1.1051E+005
	295.21	19.20	7.5932E+004		-3.0822E+004
	351.92	37.20	3.9471E+004		1.5362E+004
	785.91	1.10	1.0358E+006		-1.8302E+006

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or has not been calculated

@ = Half-life too short to be able to perform the decay correction

\*\*\*\*\*  
 \*\*\* G A M M A S E C T R U M A N A L Y S I S \*\*\*  
 \*\*\*\*\*

Filename: 3844

Report Generated On : 9/16/2017 1:59:11 PM

Sample Title : WGTV-03 09/16/2017 ✓  
 Sample Description :  
 Sample Identification :  
 Sample Type :  
 Sample Geometry : 3m - 90d ✓

Peak Locate Threshold : 3.00  
 Peak Locate Range (in channels) : 1 - 65535  
 Peak Area Range (in channels) : 200 - 8000  
 Identification Energy Tolerance : 1.000 keV

Sample Size : 2.830E+001 m2 ✓

Sample Taken On : 9/16/2017 1:48:00 PM  
 Acquisition Started : 9/16/2017 1:49:09 PM

Live Time : 600.0 seconds ✓  
 Real Time : 600.3 seconds

Dead Time : 0.04 % ✓

Energy Calibration Used Done On : 10/12/2016  
 Efficiency Calibration Used Done On : 12/16/2016  
 Efficiency ID : ULAR\_\_PLANE\_90D\_

*Reviews*  
*J. [Signature]*  
 10/2/17

\*\*\*\*\*  
\*\*\* P E A K A N A L Y S I S R E P O R T \*\*\*\*\*  
\*\*\*\*\*

Detector Name: 3844

Sample Title: WGTV-03 09/16/2017

Peak Analysis Performed on: 9/16/2017 1:59:11 PM

Peak Analysis From Channel: 200

Peak Analysis To Channel: 8000

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	743-	753	748.16	187.02	0.59	2.42E+001	29.25	8.28E+001
2	5833-	5863	5848.00	1461.73	0.95	2.04E+002	38.69	3.83E+001

= First peak in a multiplet region

= Other peak in a multiplet region

= Fitted singlet

Errors quoted at 1.960 sigma



\*\*\*\*\*  
 \*\*\* N U C L I D E I D E N T I F I C A T I O N R E P O R T \*\*\*  
 \*\*\*\*\*

Sample Title: WGTV-03 09/16/2017  
 Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/m2 )	Activity Uncertainty
K-40	0.873	1460.81*	10.67	1.21498E+006	2.50928E+005
RA-226	0.900	186.21*	3.28	1.22792E+005	1.48759E+005

\* = Energy line found in the spectrum.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.960 sigma

\*\*\*\*\*  
 \*\*\* I N T E R F E R E N C E C O R R E C T E D R E P O R T \*\*\*  
 \*\*\*\*\*

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/m2 )	Wt mean Activity Uncertainty
K-40	0.873	1.214980E+006	2.509276E+005
RA-226	0.900	1.227919E+005	1.487593E+005

? = Nuclide is part of an undetermined solution

X = Nuclide rejected by the interference analysis

@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

\*\*\*\*\* U N I D E N T I F I E D P E A K S \*\*\*\*\*

Peak Locate Performed on: 9/16/2017 1:59:11 PM  
 Peak Locate From Channel: 200  
 Peak Locate To Channel: 8000

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
-------------	-----------------	-----------------------------------	---------------------------	--------------	-----------------

All peaks were identified.

\*\*\*\*\*  
\*\*\* N U C L I D E M D A R E P O R T \*\*\*  
\*\*\*\*\*

Detector Name: 3844  
Sample Geometry:  
Sample Title: WGTV-03 09/16/2017  
Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
+	K-40	1460.81*	10.67	2.8389E+005	2.84E+005	1.2150E+006
	SC-46	889.25	99.98	1.5707E+004	1.57E+004	-2.2358E+003
		1120.51	99.99	1.9918E+004		1.1585E+004
	CO-57	122.06	85.51	2.0829E+004	2.08E+004	-2.1624E+004
		136.48	10.60	1.5481E+005		1.9381E+004
	CO-60	1173.22	100.00	1.7786E+004	1.52E+004	2.9735E+003
		1332.49	100.00	1.5196E+004		1.4302E+004
	SE-75	96.73	3.41	6.0335E+005	2.21E+004	-2.9255E+005
		121.11	16.70	1.0788E+005		-3.0110E+004
		136.00	59.20	2.7915E+004		5.6264E+003
		198.60	1.45	9.9445E+005		6.8600E+005
		264.65	59.80	2.2100E+004		1.0576E+004
		279.53	25.20	5.1687E+004		-5.0119E+004
		303.91	1.32	1.1064E+006		1.9578E+004
		400.65	11.40	1.2697E+005		6.3310E+004
	KR-85	513.99	0.43	3.8300E+006	3.83E+006	1.2546E+006
	KR-85M	151.18	75.30	2.0763E+004	2.08E+004	1.2455E+004
		304.87	14.00	1.0622E+005		3.3213E+004
	SR-85	513.99	99.27	1.6591E+004	1.66E+004	5.4345E+003
	Y-88	898.02	93.40	1.7578E+004	8.21E+003	-3.3091E+002
		1836.01	99.38	8.2060E+003		2.2869E+003
	CD-109	88.03	3.72	6.8662E+005	6.87E+005	5.2684E+004
	SN-113	255.12	1.93	6.8281E+005	1.96E+004	1.3932E+005
		391.69	64.90	1.9648E+004		-7.3465E+003
	CS-134	475.35	1.46	9.6192E+005	1.67E+004	-5.6124E+005
		563.23	8.38	1.6333E+005		-1.2982E+005
		569.32	15.43	9.0575E+004		4.6853E+004
		604.70	97.60	1.7293E+004		1.5038E+004
		795.84	85.40	1.6703E+004		3.4389E+003
		801.93	8.73	1.5912E+005		2.1964E+004
		1038.57	1.00	1.4849E+006		3.2790E+005
		1167.94	1.80	9.5149E+005		3.1830E+005
		1365.15	3.04	4.7869E+005		2.5639E+005
	CS-136	66.91	12.50	3.3540E+005	1.49E+004	-1.1844E+005
		86.29	6.30	4.1320E+005		1.0150E+005
		153.22	7.46	2.0367E+005		-1.9910E+004
		163.89	4.61	3.1957E+005		-1.1854E+005
		176.55	13.56	1.0765E+005		-9.3322E+004
		273.65	12.66	1.0870E+005		4.4022E+004
		340.57	48.50	2.8959E+004		8.5388E+003

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
CS-136	818.50	99.70	1.4883E+004	1.49E+004	-2.2421E+002
	1048.07	79.60	1.8247E+004		-5.5805E+003
	1235.34	19.70	9.2425E+004		5.4453E+004
CS-137	661.65	85.12	4.7243E+004	4.72E+004	1.9288E+005
CS-138	138.10	1.49	1.2107E+006	1.83E+004	-3.8897E+005
	227.76	1.51	1.1020E+006		-3.4081E+005
	408.98	4.66	3.6324E+005		1.8062E+004
	462.79	30.70	5.8530E+004		1.4644E+004
	546.94	10.80	1.4715E+005		4.8937E+003
	871.80	5.11	3.4552E+005		-8.0253E+004
	1009.78	29.80	5.7983E+004		1.2360E+004
	1147.22	1.24	1.5176E+006		4.6047E+005
	1343.59	1.14	1.3771E+006		1.1383E+006
	1435.86	76.30	1.8274E+004		-2.4172E+003
CE-139	165.85	80.35	1.8377E+004	1.84E+004	6.7606E+002
EU-152	121.78	28.40	6.2511E+004	5.22E+004	-6.8061E+004
	244.69	7.49	1.9523E+005		3.7105E+004
	344.27	26.50	5.2246E+004		-2.3070E+004
	411.11	2.21	6.4742E+005		-2.3079E+005
	443.98	3.11	4.9940E+005		-1.1734E+005
	778.89	12.74	9.8332E+004		1.3916E+004
	867.32	4.16	3.7108E+005		-5.3333E+004
	964.01	14.40	1.2499E+005		9.2046E+003
	1085.78	10.00	1.5505E+005		3.8976E+004
	1112.02	13.30	1.3603E+005		-1.1781E+004
EU-154	1407.95	20.70	6.1939E+004	4.45E+004	2.5950E+004
	123.07	40.40	4.4488E+004		-1.0253E+004
	188.25	0.23	6.4028E+006		2.5325E+006
	247.93	6.83	2.0322E+005		1.1338E+005
	401.30	0.19	7.4257E+006		-5.1034E+006
	444.39	0.55	2.8258E+006		-2.1137E+006
	478.26	0.21	6.7508E+006		1.3678E+006
	557.56	0.25	5.4016E+006		6.0221E+005
	582.00	0.89	1.9924E+006		2.2253E+006
	591.76	4.91	2.9433E+005		1.1900E+005
	625.22	0.32	3.9112E+006		-3.0450E+006
	676.59	0.14	9.1854E+006		-9.7913E+005
	692.42	1.78	7.5742E+005		-5.4019E+005
	715.76	0.17	8.5595E+006		4.1508E+006
	722.30	20.00	7.6818E+004		1.1014E+004
	756.86	4.50	2.7649E+005		2.1444E+005
	815.55	0.50	3.1012E+006		2.8230E+006
	845.39	0.58	2.3143E+006		2.9443E+005
	850.64	0.23	6.4248E+006		2.7839E+006
	873.20	12.09	1.2313E+005		1.7608E+004
	892.73	0.50	3.1810E+006		-1.5397E+006
	904.05	0.85	1.9048E+006		-4.4851E+005
	996.30	10.34	1.4530E+005		4.9821E+004
	1004.76	17.90	8.2246E+004		-1.9256E+003
	1128.40	0.29	6.0006E+006		4.8915E+005

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
EU-154	1140.90	0.22	7.1197E+006	4.45E+004	-5.8064E+005
	1241.60	0.13	1.4329E+007		6.5935E+006
	1246.60	0.80	2.1817E+006		-8.6236E+005
	1274.51	34.40	4.9495E+004		3.4931E+004
	1494.08	0.71	1.6582E+006		1.0057E+006
	1596.45	1.80	7.3693E+005		3.1352E+005
HG-203	279.19	77.30	1.6931E+004	1.69E+004	-1.2486E+004
BI-214	609.31	46.30	3.6646E+004	3.66E+004	-1.7015E+004
	768.36	5.04	3.0310E+005		3.0086E+005
	806.17	1.23	1.1084E+006		-1.0551E+006
	934.06	3.21	4.3627E+005		-3.3975E+005
	1120.29	15.10	1.3187E+005		7.6704E+004
	1155.19	1.69	9.6898E+005		4.5101E+004
	1238.11	5.94	2.9980E+005		-2.9082E+005
	1280.96	1.47	1.1780E+006		7.7981E+005
	1377.67	4.11	3.1605E+005		-3.1390E+005
	1385.31	0.78	1.8438E+006		-6.3906E+005
	1401.50	1.39	9.1917E+005		3.1561E+005
	1407.98	2.48	5.1700E+005		2.1660E+005
	1509.19	2.19	5.4022E+005		3.2763E+005
	1661.28	1.15	8.0014E+005		-7.9343E+004
	1729.60	3.05	2.8505E+005		-2.6698E+005
	1764.49	15.80	1.1410E+005		3.1397E+004
	1847.44	2.12	5.6964E+005		-7.1806E+004
	2118.54	1.21	0.0000E+000		0.0000E+000
	74.81	6.33	5.4953E+005	4.30E+004	6.1825E+005
	77.11	10.70	2.8805E+005		-5.5119E+002
	87.20	3.70	6.9540E+005		-9.5607E+004
	89.80	1.03	2.4418E+006		2.9345E+006
	241.98	7.49	2.0149E+005		4.6681E+004
	295.21	19.20	7.5227E+004		4.8187E+004
	351.92	37.20	4.3011E+004		3.1915E+004
	785.91	1.10	1.2987E+006		1.0349E+006

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or has not been calculated

@ = Half-life too short to be able to perform the decay correction

\*\*\*\*\*  
 \*\*\*\*\* G A M M A S P E C T R U M A N A L Y S I S \*\*\*\*\*  
 \*\*\*\*\*

Filename: 3844

Report Generated On : 9/16/2017 2:26:20 PM

Sample Title : WGTV-02 09/16/2017 ✓

Sample Description :

Sample Identification :

Sample Type :

Sample Geometry : 3m-90d ✓

Peak Locate Threshold : 3.00

Peak Locate Range (in channels) : 1 - 65535

Peak Area Range (in channels) : 200 - 8000

Identification Energy Tolerance : 1.000 keV

Sample Size : 2.830E+001 m2 ✓

Sample Taken On : 9/16/2017 2:15:00 PM ✓

Acquisition Started : 9/16/2017 2:16:19 PM ✓

Live Time : 600.0 seconds ✓

Dead Time : 600.3 seconds ✓

Dead Time : 0.04 % ✓

Energy Calibration Used Done On : 10/12/2016

Efficiency Calibration Used Done On : 12/16/2016

Efficiency ID : ULAR\_\_PLANE\_90D\_

REVIEWED  
 Joe D. Galt  
 10/2/17

peak analysis results available for reporting purposes

\*\*\*\*\*  
 \*\*\*    N U C L I D E    I D E N T I F I C A T I O N    R E P O R T    \*\*\*\*\*  
 \*\*\*\*\*

Sample Title:                    WGTV-02 09/16/2017  
 Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

.....                    IDENTIFIED NUCLIDES                    .....

Nuclide	Id	Energy	Yield	Activity	Activity
Name	Confidence	(keV)	(%)	(pCi/m2 )	Uncertainty

\* = Energy line found in the spectrum.  
 @ = Energy line not used for Weighted Mean Activity  
 Energy Tolerance :      1.000 keV  
 Nuclide confidence index threshold =      0.30  
 Errors quoted at    1.960 sigma



\*\*\*\*\*  
\*\*\* I N T E R F E R E N C E C O R R E C T E D R E P O R T \*\*\*  
\*\*\*\*\*

Nuclide	Nuclide	Wt mean	Wt mean
Name	Id	Activity	Activity
	Confidence	(pCi/m2 )	Uncertainty

? = Nuclide is part of an undetermined solution

X = Nuclide rejected by the interference analysis

@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

peak search results available for nuclide analysis.

\*\*\*\*\*  
\*\*\* N U C L I D E M D A R E P O R T \*\*\*  
\*\*\*\*\*

Detector Name: 3844  
Sample Geometry:  
Sample Title: WGTV-02 09/16/2017  
Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
K-40	1460.81	10.67	4.5657E+005	4.57E+005	1.4584E+006
SC-46	889.25	99.98	1.5552E+004	1.56E+004	-2.2893E+003
	1120.51	99.99	1.9585E+004		2.0338E+004
CO-57	122.06	85.51	2.0589E+004	2.06E+004	4.7485E+003
	136.48	10.60	1.6063E+005		3.7273E+004
✓ CO-60	1173.22	100.00	1.7179E+004	1.30E+004	6.8989E+003
	1332.49	100.00	1.3045E+004		5.3983E+003
SE-75	96.73	3.41	5.9657E+005	2.15E+004	4.2011E+004
	121.11	16.70	1.0265E+005		-9.5585E+004
	136.00	59.20	2.9012E+004		2.5673E+004
	198.60	1.45	9.8682E+005		5.1566E+005
	264.65	59.80	2.1541E+004		3.5050E+003
	279.53	25.20	5.2806E+004		-1.9669E+004
	303.91	1.32	1.0065E+006		-3.0790E+005
	400.65	11.40	1.2510E+005		6.6422E+004
KR-85	513.99	0.43	3.7831E+006	3.78E+006	2.3922E+006
KR-85M	151.18	75.30	1.9441E+004	1.94E+004	2.1646E+003
	304.87	14.00	9.6113E+004		-4.1130E+004
SR-85	513.99	99.27	1.6388E+004	1.64E+004	1.0363E+004
Y-88	898.02	93.40	1.5537E+004	9.99E+003	-1.6707E+004
	1836.01	99.38	9.9937E+003		3.8115E+003
CD-109	88.03	3.72	6.6584E+005	6.66E+005	5.4344E+005
SN-113	255.12	1.93	7.3815E+005	1.94E+004	1.6518E+005
	391.69	64.90	1.9376E+004		-2.1559E+004
CS-134	475.35	1.46	1.0625E+006	1.66E+004	2.0282E+005
	563.23	8.38	1.4820E+005		-1.0847E+005
	569.32	15.43	9.1760E+004		9.6859E+004
	604.70	97.60	1.6605E+004		-1.3979E+004
	795.84	85.40	1.7855E+004		9.8015E+003
	801.93	8.73	1.5199E+005		5.9066E+004
	1038.57	1.00	1.4221E+006		8.5591E+005
	1167.94	1.80	8.7990E+005		5.3003E+005
	1365.15	3.04	4.7869E+005		1.1432E+005
CS-136	66.91	12.50	3.3976E+005	1.38E+004	-1.8888E+005
	86.29	6.30	4.0458E+005		4.0722E+005
	153.22	7.46	1.9392E+005		-1.3551E+005
	163.89	4.61	3.2639E+005		1.9813E+004
	176.55	13.56	1.1139E+005		6.8905E+004
	273.65	12.66	1.0896E+005		3.3106E+004
	340.57	48.50	2.8241E+004		1.9986E+004

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
CS-136	818.50	99.70	1.3821E+004	1.38E+004	-2.1344E+003
	1048.07	79.60	1.7979E+004		-6.2183E+003
	1235.34	19.70	9.1361E+004		5.2346E+004
CS-137	661.65	85.12	4.4398E+004	4.44E+004	1.7239E+005
CS-138	138.10	1.49	1.2940E+006	2.06E+004	6.0331E+005
	227.76	1.51	1.1155E+006		1.0088E+005
	408.98	4.66	3.1388E+005		-1.1002E+003
	462.79	30.70	5.5044E+004		-2.2907E+004
	546.94	10.80	1.4299E+005		-4.9014E+004
	871.80	5.11	2.8672E+005		5.5116E+004
	1009.78	29.80	5.7450E+004		-1.0995E+004
	1147.22	1.24	1.5422E+006		-2.0717E+006
	1343.59	1.14	1.1714E+006		-4.9141E+005
	1435.86	76.30	2.0607E+004		4.2362E+003
CE-139	165.85	80.35	1.8178E+004	1.82E+004	3.8036E+003
EU-152	121.78	28.40	6.1313E+004	5.02E+004	-3.3384E+003
	244.69	7.49	1.9156E+005		-6.1641E+004
	344.27	26.50	5.0196E+004		-2.1247E+003
	411.11	2.21	6.0837E+005		-1.9710E+005
	443.98	3.11	5.0307E+005		-2.9457E+004
	778.89	12.74	1.1255E+005		9.1159E+004
	867.32	4.16	3.3659E+005		-3.1346E+005
	964.01	14.40	1.2395E+005		1.2112E+003
	1085.78	10.00	1.6114E+005		7.7250E+002
	1112.02	13.30	1.3739E+005		3.9428E+004
	1407.95	20.70	6.7079E+004		-7.5127E+003
EU-154	123.07	40.40	4.3895E+004	4.39E+004	2.2815E+004
	188.25	0.23	5.9548E+006		2.7514E+004
	247.93	6.83	2.0577E+005		-1.2034E+004
	401.30	0.19	7.3699E+006		4.2960E+005
	444.39	0.55	2.8671E+006		1.6264E+005
	478.26	0.21	7.0136E+006		1.0959E+006
	557.56	0.25	5.1834E+006		-1.8876E+006
	582.00	0.89	1.8382E+006		2.0460E+006
	591.76	4.91	3.0188E+005		-3.7410E+005
	625.22	0.32	3.9486E+006		-4.8372E+005
	676.59	0.14	1.0026E+007		2.6364E+006
	692.42	1.78	8.6972E+005		4.1772E+005
	715.76	0.17	7.8811E+006		1.5576E+006
	722.30	20.00	6.8744E+004		2.3179E+004
	756.86	4.50	3.0624E+005		3.5614E+004
	815.55	0.50	2.7167E+006		-1.0264E+006
	845.39	0.58	2.2848E+006		-8.8369E+005
	850.64	0.23	5.8609E+006		-1.6601E+006
	873.20	12.09	1.0291E+005		-5.8833E+004
	892.73	0.50	3.0858E+006		-2.0850E+006
	904.05	0.85	1.7351E+006		9.4496E+004
	996.30	10.34	1.3772E+005		9.1338E+004
	1004.76	17.90	7.4104E+004		-2.2206E+004
	1128.40	0.29	4.9902E+006		-6.5807E+006

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
EU-154	1140.90	0.22	7.6990E+006	4.39E+004	-4.4216E+006
	1241.60	0.13	1.3460E+007		7.1651E+005
	1246.60	0.80	1.8167E+006		-2.4936E+005
	1274.51	34.40	4.5951E+004		9.8792E+003
	1494.08	0.71	1.3728E+006		6.3998E+005
	1596.45	1.80	6.8607E+005		-1.0660E+006
HG-203	279.19	77.30	1.7383E+004	1.74E+004	-5.1097E+003
BI-214	609.31	46.30	3.7177E+004	3.72E+004	4.2475E+002
	768.36	5.04	2.7056E+005		-2.9361E+003
	806.17	1.23	1.0696E+006		3.9669E+005
	934.06	3.21	4.7520E+005		3.0930E+005
	1120.29	15.10	1.2967E+005		1.3465E+005
	1155.19	1.69	1.0180E+006		-2.9380E+005
	1238.11	5.94	3.0338E+005		-1.6280E+005
	1280.96	1.47	1.0068E+006		3.1423E+005
	1377.67	4.11	3.5624E+005		1.0008E+005
	1385.31	0.78	1.8841E+006		-1.0362E+006
	1401.50	1.39	8.9207E+005		6.2088E+005
	1407.98	2.48	5.5990E+005		-6.2707E+004
	1509.19	2.19	3.9047E+005		-9.5310E+004
	1661.28	1.15	9.1647E+005		-4.7954E+004
	1729.60	3.05	5.1947E+005		4.0343E+005
	1764.49	15.80	8.4365E+004		-1.5223E+004
	1847.44	2.12	6.5119E+005		-1.6483E+005
	2118.54	1.21	0.0000E+000		0.0000E+000
	74.81	6.33	5.3740E+005	4.12E+004	4.4405E+005
	77.11	10.70	2.8745E+005		1.3107E+005
	87.20	3.70	6.7787E+005		4.3155E+005
	89.80	1.03	2.2873E+006		-1.6643E+006
	241.98	7.49	1.9834E+005		1.7390E+004
	295.21	19.20	7.3433E+004		4.3452E+004
	351.92	37.20	4.1170E+004		1.5411E+004
	785.91	1.10	1.4686E+006		-4.0178E+005

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or has not been calculated

@ = Half-life too short to be able to perform the decay correction

\*\*\*\*\*  
 \*\*\* G A M M A S E C T R U M A N A L Y S I S \*\*\*  
 \*\*\*\*\*

Filename: 3844

Report Generated On : 9/16/2017 2:41:45 PM

Sample Title : WGTV-01 09/16/2017 ✓

Sample Description :

Sample Identification :

Sample Type :

Sample Geometry : 3 m - 90 d ✓

Peak Locate Threshold : 3.00

Peak Locate Range (in channels) : 1 - 65535

Peak Area Range (in channels) : 200 - 8000

Identification Energy Tolerance : 1.000 keV

Sample Size : 2.830E+001 m2 ✓

Sample Taken On : 9/16/2017 2:31:00 PM ✓

Acquisition Started : 9/16/2017 2:31:44 PM

Live Time : 600.0 seconds ✓

Dead Time : 600.2 seconds

Rad Time : 0.04 % ✓

Energy Calibration Used Done On : 10/12/2016

Efficiency Calibration Used Done On : 12/16/2016

Efficiency ID : ULAR\_\_PLANE\_90D\_

REVIEWED  
 Joe Ogden  
 10/24/17

\*\*\*\*\*  
\*\*\* P E A K A N A L Y S I S R E P O R T \*\*\*\*\*  
\*\*\*\*\*

Detector Name: 3844

Sample Title: WGTV-01 09/16/2017

Peak Analysis Performed on: 9/16/2017 2:41:45 PM

Peak Analysis From Channel: 200

Peak Analysis To Channel: 8000

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	2635-	2661	2648.68	662.33	0.83	2.12E+002	53.29	1.21E+002
2	5831-	5856	5845.19	1461.03	0.83	1.44E+002	37.08	5.26E+001

= First peak in a multiplet region

= Other peak in a multiplet region

= Fitted singlet

Errors quoted at 1.960 sigma

\*\*\*\*\*  
 \*\*\* N U C L I D E I D E N T I F I C A T I O N R E P O R T \*\*\*  
 \*\*\*\*\*

Sample Title: WGTV-01 09/16/2017  
 Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/m2 )	Activity Uncertainty
K-40	0.992	1460.81*	10.67	8.61238E+005	2.31854E+005
CS-137	0.929	661.65*	85.12	9.24519E+004	2.43110E+004

\* = Energy line found in the spectrum.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.960 sigma

\*\*\*\*\*  
 \*\*\* I N T E R F E R E N C E C O R R E C T E D R E P O R T \*\*\*  
 \*\*\*\*\*

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/m2 )	Wt mean Activity Uncertainty
K-40	0.992	8.612384E+005	2.318539E+005
CS-137	0.929	9.245193E+004	2.431103E+004

? = Nuclide is part of an undetermined solution

X = Nuclide rejected by the interference analysis

@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

\*\*\*\*\* U N I D E N T I F I E D P E A K S \*\*\*\*\*

Peak Locate Performed on: 9/16/2017 2:41:45 PM  
 Peak Locate From Channel: 200  
 Peak Locate To Channel: 8000

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
-------------	-----------------	-----------------------------------	---------------------------	--------------	-----------------

All peaks were identified.



\*\*\*\*\*  
\*\*\* N U C L I D E M D A R E P O R T \*\*\*\*\*  
\*\*\*\*\*

Detector Name: 3844  
Sample Geometry:  
Sample Title: WGTV-01 09/16/2017  
Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
+	K-40	1460.81*	10.67	3.0279E+005	3.03E+005	8.6124E+005
	SC-46	889.25	99.98	1.4752E+004	1.48E+004	7.8135E+003
		1120.51	99.99	1.9416E+004		-8.1124E+003
	CO-57	122.06	85.51	2.0434E+004	2.04E+004	9.9321E+003
		136.48	10.60	1.4712E+005		3.4412E+004
	CO-60	1173.22	100.00	1.5659E+004	1.30E+004	-1.8083E+004
		1332.49	100.00	1.3045E+004		-2.3320E+004
	SE-75	96.73	3.41	5.9470E+005	2.13E+004	-4.3288E+004
		121.11	16.70	1.0587E+005		7.3648E+004
		136.00	59.20	2.6248E+004		-6.2828E+003
		198.60	1.45	9.6357E+005		4.3875E+005
		264.65	59.80	2.1255E+004		2.2416E+003
		279.53	25.20	5.3356E+004		1.1119E+004
		303.91	1.32	1.0181E+006		-4.7831E+005
		400.65	11.40	1.0944E+005		1.0014E+004
	KR-85	513.99	0.43	3.8144E+006	3.81E+006	2.0623E+006
	KR-85M	151.18	75.30	1.9985E+004	2.00E+004	1.4487E+004
		304.87	14.00	9.8193E+004		4.4728E+004
	SR-85	513.99	99.27	1.6523E+004	1.65E+004	8.9333E+003
	Y-88	898.02	93.40	1.4595E+004	1.21E+004	-6.9564E+003
		1836.01	99.38	1.2095E+004		-2.8586E+002
	CD-109	88.03	3.72	6.4630E+005	6.46E+005	2.7881E+005
	SN-113	255.12	1.93	6.7118E+005	1.86E+004	3.5828E+005
		391.69	64.90	1.8628E+004		3.3751E+003
	CS-134	475.35	1.46	9.5221E+005	1.56E+004	-1.8258E+005
		563.23	8.38	1.5421E+005		6.0523E+004
		569.32	15.43	7.9739E+004		2.2612E+004
		604.70	97.60	1.5606E+004		-1.0276E+004
		795.84	85.40	1.6703E+004		9.2278E+003
		801.93	8.73	1.5560E+005		2.7300E+004
		1038.57	1.00	1.5642E+006		8.7157E+005
		1167.94	1.80	8.7990E+005		-2.8041E+005
		1365.15	3.04	3.8813E+005		-3.8734E+005
	CS-136	66.91	12.50	3.2948E+005	1.41E+004	5.4766E+004
		86.29	6.30	3.9538E+005		2.5268E+005
		153.22	7.46	1.9523E+005		6.0916E+003
		163.89	4.61	2.9396E+005		-1.7725E+005
		176.55	13.56	1.0184E+005		-8.5702E+004
		273.65	12.66	1.0660E+005		-3.4632E+003
		340.57	48.50	2.8512E+004		-4.5408E+003

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
	CS-136	818.50	99.70	1.4133E+004	1.41E+004	-9.4981E+002
		1048.07	79.60	2.0726E+004		-4.1921E+003
		1235.34	19.70	9.0280E+004		6.9750E+004
+	CS-137 CS-138	661.65*	85.12	3.4056E+004	3.41E+004 1.55E+004	9.2452E+004
		138.10	1.49	1.1647E+006		-6.0903E+005
		227.76	1.51	1.0478E+006		-6.0932E+005
		408.98	4.66	3.4006E+005		-1.5855E+005
		462.79	30.70	5.5520E+004		4.9275E+004
		546.94	10.80	1.4025E+005		-1.1280E+004
		871.80	5.11	3.3562E+005		-1.2847E+005
		1009.78	29.80	5.5230E+004		-3.9362E+004
		1147.22	1.24	1.5414E+006		-5.5378E+005
		1343.59	1.14	1.4563E+006		4.6011E+005
		1435.86	76.30	1.5490E+004		-8.8307E+003
		165.85	80.35	1.6660E+004	1.67E+004 5.05E+004	-1.1453E+004
	CE-139 EU-152	121.78	28.40	6.1582E+004		2.8755E+004
		244.69	7.49	1.9044E+005		2.0683E+005
		344.27	26.50	5.0544E+004		-1.1981E+004
		411.11	2.21	6.6727E+005		1.6380E+005
		443.98	3.11	4.4676E+005		-3.4175E+005
		778.89	12.74	1.1365E+005		-8.3144E+004
		867.32	4.16	3.9905E+005		-1.5330E+005
		964.01	14.40	1.0580E+005		3.9587E+004
		1085.78	10.00	1.6699E+005		7.4380E+004
		1112.02	13.30	1.2003E+005		-4.6027E+004
	EU-154	1407.95	20.70	6.7079E+004	4.25E+004	-1.1414E+004
		123.07	40.40	4.2541E+004		2.6505E+004
		188.25	0.23	6.3667E+006		3.0763E+006
		247.93	6.83	1.8857E+005		-1.0335E+005
		401.30	0.19	6.5674E+006		-2.1437E+005
		444.39	0.55	2.5628E+006		7.3358E+005
		478.26	0.21	6.9813E+006		4.0546E+006
		557.56	0.25	5.2572E+006		3.5683E+006
		582.00	0.89	1.7837E+006		1.1820E+006
		591.76	4.91	2.9624E+005		-2.5368E+005
		625.22	0.32	4.4037E+006		1.7639E+006
		676.59	0.14	9.5691E+006		-1.4812E+006
		692.42	1.78	6.4063E+005		-2.1914E+005
		715.76	0.17	9.0494E+006		9.3668E+006
		722.30	20.00	7.1333E+004		-5.5523E+003
		756.86	4.50	3.4437E+005		1.3820E+005
		815.55	0.50	2.8105E+006		-1.0692E+005
		845.39	0.58	2.6407E+006		3.4914E+005
		850.64	0.23	5.7862E+006		-5.4410E+006
		873.20	12.09	1.2701E+005		3.7916E+004
		892.73	0.50	2.9198E+006		-2.0506E+005
		904.05	0.85	1.8685E+006		5.0723E+005
		996.30	10.34	1.4345E+005		1.3252E+004
		1004.76	17.90	8.1138E+004		-3.2327E+004
		1128.40	0.29	6.7379E+006		3.7267E+006

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
EU-154	1140.90	0.22	7.6990E+006	4.25E+004	-2.9386E+006
	1241.60	0.13	1.3815E+007		1.0777E+006
	1246.60	0.80	1.9779E+006		-3.5684E+005
	1274.51	34.40	4.7404E+004		2.9371E+004
	1494.08	0.71	1.6582E+006		3.1375E+005
	1596.45	1.80	6.8607E+005		4.1609E+005
HG-203	279.19	77.30	1.7517E+004	1.75E+004	8.5475E+003
BI-214	609.31	46.30	3.3468E+004	3.35E+004	8.5777E+003
	768.36	5.04	3.0054E+005		-2.3531E+004
	806.17	1.23	9.4260E+005		-1.1956E+006
	934.06	3.21	4.7520E+005		4.1308E+005
	1120.29	15.10	1.2855E+005		-5.3710E+004
	1155.19	1.69	9.3032E+005		1.4423E+005
	1238.11	5.94	3.1386E+005		1.9495E+005
	1280.96	1.47	1.0068E+006		-4.1088E+005
	1377.67	4.11	3.3279E+005		-3.6695E+005
	1385.31	0.78	1.8438E+006		-5.2928E+004
	1401.50	1.39	1.0428E+006		-7.4284E+005
	1407.98	2.48	5.5990E+005		-9.5274E+004
	1509.19	2.19	5.1883E+005		2.9784E+005
	1661.28	1.15	8.0014E+005		3.0516E+005
	1729.60	3.05	4.1338E+005		2.3731E+005
	1764.49	15.80	8.4365E+004		5.1166E+004
	1847.44	2.12	4.7069E+005		1.7952E+005
	2118.54	1.21	0.0000E+000		0.0000E+000
	74.81	6.33	5.2612E+005	3.91E+004	2.0452E+005
	77.11	10.70	2.7744E+005		-1.1102E+005
	87.20	3.70	6.5133E+005		-4.7111E+005
	89.80	1.03	2.2627E+006		-7.4372E+004
	241.98	7.49	2.0288E+005		1.7050E+005
	295.21	19.20	7.3433E+004		-4.5457E+004
	351.92	37.20	3.9122E+004		1.0214E+004
	785.91	1.10	1.2455E+006		2.5043E+004

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or has not been calculated

@ = Half-life too short to be able to perform the decay correction

Filename: 3844

Report Generated On : 9/18/2017 8:39:51 AM

Sample Title : WGTV 16 ✓  
 Sample Description :  
 Sample Identification :  
 Sample Type :  
 Sample Geometry : 3m\_90d ✓

Peak Locate Threshold : 3.00  
 Peak Locate Range (in channels) : 1 - 65535  
 Peak Area Range (in channels) : 200 - 8000  
 Identification Energy Tolerance : 1.000 keV

Sample Size : 2.830E+001 m2 ✓

Sample Taken On : 9/18/2017 8:29:00 AM  
 Acquisition Started : 9/18/2017 8:29:50 AM ✓

Live Time : 600.0 seconds ✓  
 Dead Time : 600.2 seconds

Rad Time : 0.04 % ✓

Energy Calibration Used Done On : 10/12/2016  
 Efficiency Calibration Used Done On : 12/16/2016  
 Efficiency ID : ULAR\_\_PLANE\_90D\_

*Reviewed  
 J. Ogilvie  
 10/2/12*

\*\*\*\*\*  
\*\*\* P E A K A N A L Y S I S R E P O R T \*\*\*\*\*  
\*\*\*\*\*

Detector Name: 3844

Sample Title: WGTV 16

Peak Analysis Performed on: 9/18/2017 8:39:51 AM

Peak Analysis From Channel: 200

Peak Analysis To Channel: 8000

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	5837-	5854	5843.87	1460.70	1.09	7.88E+001	39.12	7.92E+001

= First peak in a multiplet region

= Other peak in a multiplet region

= Fitted singlet

Errors quoted at 1.960 sigma

\*\*\*\*\*  
 \*\*\*    N U C L I D E    I D E N T I F I C A T I O N    R E P O R T    \*\*\*\*\*  
 \*\*\*\*\*

Sample Title:                    WGTV 16  
 Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/m2 )	Activity Uncertainty
K-40	0.998	1460.81*	10.67	4.70111E+005	2.36335E+005

\* = Energy line found in the spectrum.  
 @ = Energy line not used for Weighted Mean Activity  
 Energy Tolerance :      1.000 keV  
 Nuclide confidence index threshold =      0.30  
 Errors quoted at    1.960 sigma

\*\*\*\*\*  
 \*\*\* I N T E R F E R E N C E C O R R E C T E D R E P O R T \*\*\*  
 \*\*\*\*\*

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/m2 )	Wt mean Activity Uncertainty
K-40	0.998	4.701113E+005	2.363351E+005

? = Nuclide is part of an undetermined solution

X = Nuclide rejected by the interference analysis

@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

\*\*\*\*\* U N I D E N T I F I E D P E A K S \*\*\*\*\*

Peak Locate Performed on: 9/18/2017 8:39:51 AM  
 Peak Locate From Channel: 200  
 Peak Locate To Channel: 8000

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
-------------	-----------------	-----------------------------------	---------------------------	--------------	-----------------

All peaks were identified.

\*\*\*\*\*  
\*\*\* N U C L I D E M D A R E P O R T \*\*\*\*\*  
\*\*\*\*\*

Detector Name: 3844  
Sample Geometry: 3m 90d  
Sample Title: WGTV 16  
Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
+	K-40	1460.81*	10.67	3.6678E+005	3.67E+005	4.7011E+005
	SC-46	889.25	99.98	1.5707E+004	1.57E+004	1.8050E+004
		1120.51	99.99	1.8368E+004		1.7649E+004
	CO-57	122.06	85.51	1.9338E+004	1.93E+004	-3.4027E+003
		136.48	10.60	1.4804E+005		2.5958E+004
	CO-60	1173.22	100.00	1.5659E+004	1.30E+004	2.2731E+003
		1332.49	100.00	1.3045E+004		-3.4353E+003
	SE-75	96.73	3.41	6.1006E+005	2.04E+004	-1.3602E+005
		121.11	16.70	1.0041E+005		-5.2877E+004
		136.00	59.20	2.6642E+004		-2.7315E+003
		198.60	1.45	9.3488E+005		3.2149E+005
		264.65	59.80	2.0373E+004		8.4044E+003
		279.53	25.20	4.9959E+004		3.2175E+004
		303.91	1.32	8.9500E+005		1.3161E+005
		400.65	11.40	9.7925E+004		-1.0076E+005
	KR-85	513.99	0.43	3.6712E+006	3.67E+006	-2.9866E+006
	KR-85M	151.18	75.30	1.8853E+004	1.89E+004	-5.9967E+003
		304.87	14.00	8.2957E+004		-6.6369E+004
	SR-85	513.99	99.27	1.5903E+004	1.59E+004	-1.2937E+004
	Y-88	898.02	93.40	1.6421E+004	1.14E+004	8.9441E+003
		1836.01	99.38	1.1447E+004		2.9947E+002
	CD-109	88.03	3.72	6.3533E+005	6.35E+005	-4.6820E+005
	SN-113	255.12	1.93	6.3315E+005	1.80E+004	-1.4684E+005
		391.69	64.90	1.8046E+004		-6.6926E+003
	CS-134	475.35	1.46	8.8108E+005	1.60E+004	-6.1627E+005
		563.23	8.38	1.6333E+005		1.3008E+004
		569.32	15.43	8.8154E+004		-4.9924E+004
		604.70	97.60	1.5977E+004		-1.4427E+003
		795.84	85.40	1.7207E+004		7.7970E+003
		801.93	8.73	1.6920E+005		-7.8136E+004
		1038.57	1.00	1.4849E+006		3.2790E+005
		1167.94	1.80	9.0446E+005		-7.9530E+005
		1365.15	3.04	4.1292E+005		1.7466E+005
	CS-136	66.91	12.50	3.2998E+005	1.47E+004	1.1862E+005
		86.29	6.30	3.8992E+005		1.9799E+005
		153.22	7.46	1.9549E+005		7.4825E+004
		163.89	4.61	2.9862E+005		1.2133E+005
		176.55	13.56	1.0054E+005		-4.8601E+004
		273.65	12.66	9.8890E+004		4.3219E+003
		340.57	48.50	2.6058E+004		8.5774E+003



Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
CS-136	818.50	99.70	1.4736E+004	1.47E+004	8.8171E+003
	1048.07	79.60	1.7979E+004		-6.2182E+003
	1235.34	19.70	9.6555E+004		-4.7639E+004
CS-137	661.65	85.12	2.1818E+004	2.18E+004	2.7197E+004
CS-138	138.10	1.49	1.1979E+006	1.75E+004	9.6565E+005
	227.76	1.51	9.9739E+005		-4.8264E+005
	408.98	4.66	2.8030E+005		-5.8152E+004
	462.79	30.70	4.3624E+004		-3.6088E+004
	546.94	10.80	1.4149E+005		-4.8828E+004
	871.80	5.11	2.9585E+005		-1.0550E+005
	1009.78	29.80	5.5346E+004		1.2222E+004
	1147.22	1.24	1.8467E+006		2.0793E+006
	1343.59	1.14	1.2331E+006		-3.1730E+004
	1435.86	76.30	1.7534E+004		4.0365E+003
CE-139	165.85	80.35	1.7066E+004	1.71E+004	-3.3115E+003
EU-152	121.78	28.40	5.8421E+004	4.60E+004	-8.6838E+003
	244.69	7.49	1.8282E+005		-1.0016E+005
	344.27	26.50	4.5998E+004		-7.9028E+003
	411.11	2.21	5.5176E+005		1.6662E+005
	443.98	3.11	3.8656E+005		-1.3485E+005
	778.89	12.74	1.0451E+005		-9.6764E+003
	867.32	4.16	3.5237E+005		1.5575E+004
	964.01	14.40	1.1182E+005		-5.6871E+004
	1085.78	10.00	1.4201E+005		-9.7673E+004
	1112.02	13.30	1.2462E+005		3.4688E+004
	1407.95	20.70	7.0270E+004		2.2040E+004
EU-154	123.07	40.40	4.0397E+004	4.04E+004	-9.9700E+003
	188.25	0.23	5.8767E+006		-4.7125E+006
	247.93	6.83	1.8531E+005		1.4261E+004
	401.30	0.19	5.6442E+006		-1.0690E+007
	444.39	0.55	2.2145E+006		-3.0256E+005
	478.26	0.21	6.6152E+006		-2.0257E+006
	557.56	0.25	5.1084E+006		-2.9428E+006
	582.00	0.89	1.8292E+006		1.9197E+006
	591.76	4.91	2.6611E+005		-1.6919E+005
	625.22	0.32	3.9486E+006		-1.6333E+006
	676.59	0.14	9.9368E+006		-6.0187E+005
	692.42	1.78	7.3568E+005		-1.5742E+005
	715.76	0.17	8.5595E+006		2.8627E+006
	722.30	20.00	7.6230E+004		-2.4593E+003
	756.86	4.50	2.9669E+005		-5.5463E+004
	815.55	0.50	2.8712E+006		-2.7798E+006
	845.39	0.58	2.1623E+006		-9.1178E+005
	850.64	0.23	5.2300E+006		-3.2639E+006
	873.20	12.09	1.1495E+005		-2.8028E+004
	892.73	0.50	3.0858E+006		-1.8385E+006
	904.05	0.85	2.0429E+006		-7.4436E+005
	996.30	10.34	1.6093E+005		-5.5488E+004
	1004.76	17.90	8.8576E+004		4.8240E+003
	1128.40	0.29	5.4485E+006		-3.5503E+006

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
EU-154	1140.90	0.22	9.2801E+006	4.04E+004	2.1301E+006
	1241.60	0.13	1.4824E+007		1.9281E+006
	1246.60	0.80	2.0084E+006		-1.8832E+006
	1274.51	34.40	4.6684E+004		-2.1744E+004
	1494.08	0.71	1.5235E+006		8.2283E+005
	1596.45	1.80	5.6800E+005		2.6478E+005
HG-203	279.19	77.30	1.6324E+004	1.63E+004	1.3179E+004
BI-214	609.31	46.30	3.3664E+004	3.37E+004	1.1350E+003
	768.36	5.04	2.7056E+005		-1.9544E+005
	806.17	1.23	1.2282E+006		-7.6578E+004
	934.06	3.21	3.9957E+005		-2.3383E+005
	1120.29	15.10	1.2161E+005		1.1685E+005
	1155.19	1.69	1.0180E+006		-9.5353E+005
	1238.11	5.94	3.1041E+005		-2.3879E+003
	1280.96	1.47	9.6852E+005		-7.5289E+005
	1377.67	4.11	2.8884E+005		6.4152E+004
	1385.31	0.78	1.4222E+006		-9.0174E+005
	1401.50	1.39	1.0878E+006		5.3420E+004
	1407.98	2.48	5.8654E+005		1.8396E+005
	1509.19	2.19	4.9634E+005		2.6806E+005
	1661.28	1.15	1.1489E+006		2.5430E+005
	1729.60	3.05	3.3468E+005		-5.4384E+004
	1764.49	15.80	1.0441E+005		8.3725E+004
	1847.44	2.12	5.0634E+005		-1.3165E+005
	2118.54	1.21	0.0000E+000		0.0000E+000
	74.81	6.33	5.2383E+005	3.36E+004	4.5802E+005
	77.11	10.70	2.7309E+005		-1.0036E+005
	87.20	3.70	6.4134E+005		-7.7949E+005
	89.80	1.03	2.2128E+006		-1.2848E+006
	241.98	7.49	1.9585E+005		2.3917E+004
	295.21	19.20	6.4719E+004		4.0045E+004
	351.92	37.20	3.3567E+004		-1.1521E+004
	785.91	1.10	1.2856E+006		4.6705E+005

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or has not been calculated

@ = Half-life too short to be able to perform the decay correction

Filename: 3844

Report Generated On : 9/18/2017 8:26:32 AM

Sample Title : WGTV 15 ✓  
 Sample Description :  
 Sample Identification :  
 Sample Type :  
 Sample Geometry : 3m\_90d ✓

Peak Locate Threshold : 3.00  
 Peak Locate Range (in channels) : 1 - 65535  
 Peak Area Range (in channels) : 200 - 8000  
 Identification Energy Tolerance : 1.000 keV

Sample Size : 2.830E+001 m2 ✓

Sample Taken On : 9/18/2017 8:16:00 AM  
 Acquisition Started : 9/18/2017 8:16:32 AM ✓

Live Time : 600.0 seconds ✓  
 Real Time : 600.3 seconds

Dead Time : 0.04 % ✓

Energy Calibration Used Done On : 10/12/2016  
 Efficiency Calibration Used Done On : 12/16/2016  
 Efficiency ID : ULAR\_\_PLANE\_90D\_

*REVIEWED*  
*Joe D. Galt*  
*10/2/17*

peak analysis results available for reporting purposes

\*\*\*\*\*  
 \*\*\* N U C L I D E I D E N T I F I C A T I O N R E P O R T \*\*\*  
 \*\*\*\*\*

Sample Title: WGTV 15  
 Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide	Id	Energy	Yield	Activity	Activity
Name	Confidence	(keV)	(%)	(pCi/m2 )	Uncertainty

\* = Energy line found in the spectrum.  
 @ = Energy line not used for Weighted Mean Activity  
 Energy Tolerance : 1.000 keV  
 Nuclide confidence index threshold = 0.30  
 Errors quoted at 1.960 sigma

\*\*\*\*\*  
 \*\*\* I N T E R F E R E N C E C O R R E C T E D R E P O R T \*\*\*  
 \*\*\*\*\*

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/m2 )	Wt mean Activity Uncertainty
-----------------	-----------------------------	----------------------------------	------------------------------------

? = Nuclide is part of an undetermined solution  
 X = Nuclide rejected by the interference analysis  
 @ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

peak search results available for nuclide analysis.

\*\*\*\*\*  
\*\*\* N U C L I D E M D A R E P O R T \*\*\*  
\*\*\*\*\*

Detector Name: 3844  
Sample Geometry: 3m 90d  
Sample Title: WGTV 15  
Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
K-40	1460.81	10.67	4.7539E+005	4.75E+005	1.5713E+006
SC-46	889.25	99.98	1.3900E+004	1.39E+004	1.9575E+003
	1120.51	99.99	1.7632E+004		-8.0238E+001
CO-57	122.06	85.51	2.0434E+004	2.04E+004	7.3041E+003
	136.48	10.60	1.5093E+005		7.2014E+004
CO-60	1173.22	100.00	1.8372E+004	1.34E+004	9.5343E+003
	1332.49	100.00	1.3376E+004		-6.2572E+003
SE-75	96.73	3.41	5.9780E+005	2.13E+004	-3.6192E+005
	121.11	16.70	1.0699E+005		7.7759E+004
	136.00	59.20	2.7095E+004		9.9516E+002
	198.60	1.45	9.3973E+005		-1.1615E+005
	264.65	59.80	2.1255E+004		6.7540E+003
	279.53	25.20	4.9665E+004		-4.6376E+004
	303.91	1.32	9.7082E+005		-1.2478E+004
	400.65	11.40	9.7925E+004		-2.2378E+004
KR-85	513.99	0.43	3.8763E+006	3.88E+006	2.3320E+005
KR-85M	151.18	75.30	1.9322E+004	1.93E+004	-5.6098E+003
	304.87	14.00	9.2768E+004		5.2241E+004
SR-85	513.99	99.27	1.6791E+004	1.68E+004	1.0102E+003
Y-88	898.02	93.40	1.6760E+004	1.21E+004	-3.5093E+003
	1836.01	99.38	1.2095E+004		-2.2702E+004
CD-109	88.03	3.72	6.7692E+005	6.77E+005	7.4162E+005
SN-113	255.12	1.93	6.4550E+005	1.96E+004	1.9356E+005
	391.69	64.90	1.9648E+004		-1.1905E+004
CS-134	475.35	1.46	8.1484E+005	1.70E+004	-1.5065E+005
	563.23	8.38	1.5770E+005		-1.8915E+004
	569.32	15.43	8.1764E+004		1.5687E+004
	604.70	97.60	1.7953E+004		-1.8155E+002
	795.84	85.40	1.7040E+004		7.4966E+003
	801.93	8.73	1.6757E+005		1.0411E+005
	1038.57	1.00	1.7627E+006		1.0846E+006
	1167.94	1.80	9.6286E+005		1.0105E+005
	1365.15	3.04	4.0075E+005		1.7112E+005
CS-136	66.91	12.50	3.2798E+005	1.46E+004	-8.3335E+004
	86.29	6.30	3.9693E+005		-3.0152E+005
	153.22	7.46	1.8965E+005		-7.6725E+004
	163.89	4.61	3.0183E+005		4.8693E+004
	176.55	13.56	1.0216E+005		2.9830E+004
	273.65	12.66	1.0199E+005		-2.2406E+004
	340.57	48.50	2.5149E+004		8.5860E+003

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
CS-136	818.50	99.70	1.4588E+004	1.46E+004	2.4086E+003
	1048.07	79.60	1.9281E+004		-1.8404E+004
	1235.34	19.70	9.1358E+004		-1.0640E+005
CS-137	661.65	85.12	1.8706E+004	1.87E+004	7.1646E+003
CS-138	138.10	1.49	1.1873E+006	2.22E+004	-1.3834E+005
	227.76	1.51	1.0094E+006		2.7837E+005
	408.98	4.66	2.8511E+005		1.1980E+004
	462.79	30.70	4.6770E+004		-1.0552E+004
	546.94	10.80	1.3284E+005		-8.2669E+004
	871.80	5.11	3.3755E+005		-5.3115E+004
	1009.78	29.80	5.4989E+004		3.7732E+004
	1147.22	1.24	1.5712E+006		-2.0781E+006
	1343.59	1.14	1.3268E+006		-6.2066E+005
	1435.86	76.30	2.2237E+004		7.2276E+003
CE-139	165.85	80.35	1.7305E+004	1.73E+004	-1.6162E+004
EU-152	121.78	28.40	6.1982E+004	4.38E+004	2.3785E+004
	244.69	7.49	1.8126E+005		-2.0200E+005
	344.27	26.50	4.3840E+004		-1.1653E+005
	411.11	2.21	5.4877E+005		1.6748E+005
	443.98	3.11	4.1670E+005		3.5145E+005
	778.89	12.74	1.0804E+005		2.7685E+004
	867.32	4.16	3.6372E+005		-6.4342E+004
	964.01	14.40	1.3202E+005		1.0852E+004
	1085.78	10.00	1.3252E+005		1.9109E+004
	1112.02	13.30	1.2611E+005		-1.4654E+005
EU-154	1407.95	20.70	5.8221E+004	4.26E+004	-4.7126E+003
	123.07	40.40	4.2636E+004		-5.5415E+003
	188.25	0.23	5.9934E+006		-1.3795E+005
	247.93	6.83	1.8246E+005		-1.2853E+005
	401.30	0.19	5.8269E+006		7.0171E+005
	444.39	0.55	2.2808E+006		-2.6643E+005
	478.26	0.21	5.9262E+006		2.1150E+006
	557.56	0.25	5.1834E+006		-1.1599E+006
	582.00	0.89	1.7081E+006		1.6631E+006
	591.76	4.91	2.6181E+005		-6.2357E+004
	625.22	0.32	4.3033E+006		-4.3541E+005
	676.59	0.14	9.9368E+006		-2.0984E+006
	692.42	1.78	6.9779E+005		1.2346E+005
	715.76	0.17	7.2198E+006		-2.6634E+005
	722.30	20.00	7.3211E+004		2.2250E+004
	756.86	4.50	3.5522E+005		1.7363E+005
	815.55	0.50	2.9886E+006		1.8933E+006
	845.39	0.58	2.4561E+006		1.1714E+006
	850.64	0.23	6.2890E+006		-6.6941E+006
	873.20	12.09	1.2313E+005		1.9182E+004
	892.73	0.50	2.8504E+006		-6.2795E+005
	904.05	0.85	2.1560E+006		-2.2000E+005
	996.30	10.34	1.3376E+005		9.2524E+004
	1004.76	17.90	7.5327E+004		3.7903E+003
	1128.40	0.29	5.6625E+006		-3.2871E+006



Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
EU-154	1140.90	0.22	8.0600E+006	4.26E+004	1.9331E+006
	1241.60	0.13	1.4824E+007		7.2826E+006
	1246.60	0.80	2.2362E+006		-2.6717E+005
	1274.51	34.40	5.0171E+004		4.5996E+004
	1494.08	0.71	1.5235E+006		-1.3942E+006
	1596.45	1.80	6.5891E+005		-5.1822E+005
HG-203	279.19	77.30	1.6561E+004	1.66E+004	-1.3759E+003
BI-214	609.31	46.30	3.9720E+004	3.97E+004	3.2669E+004
	768.36	5.04	3.2523E+005		1.5947E+005
	806.17	1.23	1.2168E+006		-6.8989E+004
	934.06	3.21	4.8048E+005		3.3684E+005
	1120.29	15.10	1.1673E+005		-5.3124E+002
	1155.19	1.69	1.0416E+006		4.1843E+005
	1238.11	5.94	3.1727E+005		-5.4533E+004
	1280.96	1.47	1.2393E+006		4.4679E+005
	1377.67	4.11	3.0729E+005		2.2239E+005
	1385.31	0.78	1.5773E+006		5.6989E+005
	1401.50	1.39	8.3480E+005		-4.1854E+005
	1407.98	2.48	4.8596E+005		-3.9335E+004
	1509.19	2.19	6.5198E+005		5.0634E+005
	1661.28	1.15	8.0014E+005		3.0516E+005
	1729.60	3.05	2.5546E+005		7.1194E+004
	1764.49	15.80	1.2080E+005		1.1629E+005
	1847.44	2.12	5.9830E+005		1.3962E+005
	2118.54	1.21	0.0000E+000		0.0000E+000
	74.81	6.33	5.4129E+005	3.91E+004	6.2999E+005
	77.11	10.70	2.8143E+005		-5.9744E+004
	87.20	3.70	6.8857E+005		7.3301E+005
	89.80	1.03	2.3050E+006		-8.7726E+005
	241.98	7.49	2.0010E+005		-1.6235E+004
	295.21	19.20	6.9123E+004		3.5583E+004
	351.92	37.20	3.9122E+004		4.2345E+004
	785.91	1.10	1.1607E+006		-1.3085E+006

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or has not been calculated

@ = Half-life too short to be able to perform the decay correction

Filename: 3844

Report Generated On : 9/16/2017 1:19:19 PM

Sample Title : WGTV-14 09/16/2017 ✓  
 Sample Description :  
 Sample Identification :  
 Sample Type :  
 Sample Geometry : 3 m - 90 d ✓

Peak Locate Threshold : 3.00  
 Peak Locate Range (in channels) : 1 - 65535  
 Peak Area Range (in channels) : 200 - 8000  
 Identification Energy Tolerance : 1.000 keV

Sample Size : 2.830E+001 m2 ✓

Sample Taken On : 9/16/2017 1:08:00 PM  
 Acquisition Started : 9/16/2017 1:09:18 PM

Live Time : 600.0 seconds ✓  
 Dead Time : 600.2 seconds  
 Bad Time : 0.04 % ✓

Energy Calibration Used Done On : 10/12/2016  
 Efficiency Calibration Used Done On : 12/16/2016  
 Efficiency ID : ULAR\_\_PLANE\_90D\_

REVIEWED  
 Joe D. Joch  
 10/21/17

peak analysis results available for reporting purposes

\*\*\*\*\*  
 \*\*\*    N U C L I D E    I D E N T I F I C A T I O N    R E P O R T    \*\*\*\*\*  
 \*\*\*\*\*

Sample Title:                    WGTV-14 09/16/2017  
 Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide	Id	Energy	Yield	Activity	Activity
Name	Confidence	(keV)	(%)	(pCi/m2 )	Uncertainty

\* = Energy line found in the spectrum.  
 @ = Energy line not used for Weighted Mean Activity  
 Energy Tolerance :      1.000 keV  
 Nuclide confidence index threshold =    0.30  
 Errors quoted at    1.960 sigma

\*\*\*\*\*  
\*\*\* I N T E R F E R E N C E C O R R E C T E D R E P O R T \*\*\*  
\*\*\*\*\*

Nuclide	Nuclide	Wt mean	Wt mean
Name	Id	Activity	Activity
	Confidence	(pCi/m2 )	Uncertainty

? = Nuclide is part of an undetermined solution

X = Nuclide rejected by the interference analysis

@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

peak search results available for nuclide analysis.

\*\*\*\*\*  
\*\*\* N U C L I D E M D A R E P O R T \*\*\*\*\*  
\*\*\*\*\*

Detector Name: 3844  
Sample Geometry:  
Sample Title: WGTV-14 09/16/2017  
Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
K-40	1460.81	10.67	4.9749E+005	4.97E+005	1.7949E+006
SC-46	889.25	99.98	1.3900E+004	1.39E+004	4.1609E+003
	1120.51	99.99	1.9753E+004		1.8118E+004
CO-57	122.06	85.51	2.0300E+004	2.03E+004	-6.3038E+003
	136.48	10.60	1.4858E+005		-2.7395E+004
CO-60	1173.22	100.00	1.6546E+004	1.30E+004	1.3096E+003
	1332.49	100.00	1.3045E+004		-7.9661E+003
SE-75	96.73	3.41	6.0824E+005	2.08E+004	-2.5114E+005
	121.11	16.70	1.0450E+005		6.9854E+003
	136.00	59.20	2.6902E+004		2.1279E+003
	198.60	1.45	9.5728E+005		-1.7789E+005
	264.65	59.80	2.0848E+004		-4.8255E+003
	279.53	25.20	5.1828E+004		2.0316E+004
	303.91	1.32	9.2738E+005		-6.0069E+005
	400.65	11.40	1.1212E+005		1.6716E+004
KR-85	513.99	0.43	3.6549E+006	3.65E+006	4.4179E+006
KR-85M	151.18	75.30	1.9546E+004	1.95E+004	1.8298E+004
	304.87	14.00	8.9681E+004		-2.8093E+004
SR-85	513.99	99.27	1.5832E+004	1.58E+004	1.9138E+004
Y-88	898.02	93.40	1.5354E+004	5.61E+003	3.3341E+003
	1836.01	99.38	5.6096E+003		7.6230E+002
CD-109	88.03	3.72	6.5013E+005	6.50E+005	-1.9176E+005
SN-113	255.12	1.93	6.7619E+005	1.83E+004	1.3347E+005
	391.69	64.90	1.8339E+004		1.2704E+004
CS-134	475.35	1.46	8.7577E+005	1.70E+004	1.9111E+005
	563.23	8.38	1.4447E+005		7.5825E+004
	569.32	15.43	8.1095E+004		2.4139E+004
	604.70	97.60	1.8510E+004		1.2187E+004
	795.84	85.40	1.7040E+004		4.0391E+003
	801.93	8.73	1.6085E+005		7.8578E+004
	1038.57	1.00	1.6394E+006		6.3059E+004
	1167.94	1.80	9.6286E+005		3.4861E+005
	1365.15	3.04	4.4718E+005		-2.1362E+005
CS-136	66.91	12.50	3.2699E+005	1.57E+004	-1.9723E+004
	86.29	6.30	3.8953E+005		1.7034E+005
	153.22	7.46	1.9180E+005		-1.1341E+005
	163.89	4.61	2.8732E+005		-1.9701E+005
	176.55	13.56	9.9386E+004		-7.3841E+004
	273.65	12.66	1.0227E+005		-2.7248E+004
	340.57	48.50	2.6742E+004		1.5134E+004

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
CS-136	818.50	99.70	1.5733E+004	1.57E+004	-1.5886E+003
	1048.07	79.60	1.7979E+004		-1.1204E+004
	1235.34	19.70	1.0971E+005		-9.3482E+003
CS-137	661.65	85.12	1.5345E+004	1.53E+004	5.6818E+003
CS-138	138.10	1.49	1.2014E+006	2.01E+004	2.4514E+004
	227.76	1.51	1.0242E+006		-2.0647E+005
	408.98	4.66	2.8317E+005		-1.4754E+005
	462.79	30.70	4.7275E+004		-5.8809E+003
	546.94	10.80	1.3906E+005		-4.8766E+004
	871.80	5.11	3.5995E+005		1.6514E+005
	1009.78	29.80	6.1732E+004		2.2621E+004
	1147.22	1.24	1.6689E+006		-1.1768E+006
	1343.59	1.14	1.4441E+006		8.4573E+005
	1435.86	76.30	2.0060E+004		8.2780E+003
CE-139	165.85	80.35	1.6131E+004	1.61E+004	-1.6679E+004
EU-152	121.78	28.40	6.1044E+004	4.56E+004	-3.6438E+004
	244.69	7.49	1.8086E+005		-2.6184E+005
	344.27	26.50	4.5613E+004		-4.0212E+004
	411.11	2.21	5.2730E+005		1.3657E+005
	443.98	3.11	4.2552E+005		1.1999E+005
	778.89	12.74	1.0209E+005		-1.2822E+005
	867.32	4.16	3.8534E+005		-2.8023E+005
	964.01	14.40	1.3104E+005		2.7131E+004
	1085.78	10.00	1.5084E+005		-1.4616E+005
	1112.02	13.30	1.3328E+005		-1.5624E+005
	1407.95	20.70	6.1939E+004		4.4827E+004
EU-154	123.07	40.40	4.3386E+004	4.34E+004	1.7999E+004
	188.25	0.23	6.0414E+006		-5.9542E+006
	247.93	6.83	1.8949E+005		-3.6101E+004
	401.30	0.19	6.6616E+006		1.8441E+006
	444.39	0.55	2.3325E+006		-1.0712E+006
	478.26	0.21	6.1896E+006		2.4117E+006
	557.56	0.25	4.8761E+006		7.8630E+005
	582.00	0.89	1.8560E+006		3.8623E+005
	591.76	4.91	2.8657E+005		-3.7424E+004
	625.22	0.32	4.1300E+006		5.6797E+005
	676.59	0.14	1.0462E+007		6.0146E+006
	692.42	1.78	8.1894E+005		-3.9843E+005
	715.76	0.17	8.1901E+006		-1.8068E+006
	722.30	20.00	7.3825E+004		3.9383E+004
	756.86	4.50	3.0935E+005		1.8019E+005
	815.55	0.50	3.2360E+006		2.5828E+006
	845.39	0.58	2.5370E+006		1.3492E+006
	850.64	0.23	6.2199E+006		1.0480E+006
	873.20	12.09	1.2953E+005		7.7229E+003
	892.73	0.50	2.9198E+006		1.5262E+005
	904.05	0.85	1.8685E+006		-3.3817E+006
	996.30	10.34	1.4713E+005		6.5145E+004
	1004.76	17.90	9.4448E+004		1.0038E+004
	1128.40	0.29	5.9347E+006		-5.0676E+006

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
EU-154	1140.90	0.22	8.6526E+006	4.34E+004	5.5665E+006
	1241.60	0.13	1.5763E+007		1.3915E+007
	1246.60	0.80	2.2091E+006		-7.7407E+005
	1274.51	34.40	5.0837E+004		-5.9876E+004
	1494.08	0.71	1.4506E+006		0.0000E+000
	1596.45	1.80	5.3346E+005		-7.8805E+003
HG-203	279.19	77.30	1.6701E+004	1.67E+004	-2.9468E+003
BI-214	609.31	46.30	3.8724E+004	3.87E+004	1.6330E+004
	768.36	5.04	3.1067E+005		7.0499E+004
	806.17	1.23	1.2618E+006		6.2643E+004
	934.06	3.21	4.6444E+005		1.9740E+005
	1120.29	15.10	1.3078E+005		1.1995E+005
	1155.19	1.69	1.0180E+006		-3.0695E+005
	1238.11	5.94	3.4009E+005		-6.4950E+004
	1280.96	1.47	1.1622E+006		-3.8497E+005
	1377.67	4.11	4.2420E+005		2.4834E+005
	1385.31	0.78	1.8025E+006		-3.1468E+006
	1401.50	1.39	8.9207E+005		-1.1087E+004
	1407.98	2.48	5.1700E+005		3.7417E+005
	1509.19	2.19	6.1732E+005		2.1147E+005
	1661.28	1.15	8.6074E+005		-2.3905E+005
	1729.60	3.05	2.8505E+005		9.4925E+004
	1764.49	15.80	1.0937E+005		9.3028E+004
	1847.44	2.12	3.8649E+005		1.0771E+005
	2118.54	1.21	0.0000E+000		0.0000E+000
	74.81	6.33	5.3572E+005	3.62E+004	5.5887E+005
	77.11	10.70	2.7652E+005		4.3669E+004
	87.20	3.70	6.5986E+005		-1.4681E+005
	89.80	1.03	2.3160E+006		7.1464E+005
	241.98	7.49	2.0045E+005		1.4245E+005
	295.21	19.20	6.9701E+004		2.1920E+004
	351.92	37.20	3.6203E+004		2.4333E+004
	785.91	1.10	1.2987E+006		-1.7757E+005

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or has not been calculated

@ = Half-life too short to be able to perform the decay correction



Filename: 3844

Report Generated On : 9/16/2017 1:06:07 PM

Sample Title : WGTV-13 09/16/2017 ✓

Sample Description :

Sample Identification :

Sample Type :

Sample Geometry : 3m-90d ✓

Peak Locate Threshold : 3.00

Peak Locate Range (in channels) : 1 - 65535

Peak Area Range (in channels) : 200 - 8000

Identification Energy Tolerance : 1.000 keV

Sample Size : 2.830E+001 m2 ✓

Sample Taken On : 9/16/2017 12:55:00 PM

Acquisition Started : 9/16/2017 12:56:06 PM

Live Time : 600.0 seconds ✓

Dead Time : 600.2 seconds

Rad Time : 0.04 % ✓

Energy Calibration Used Done On : 10/12/2016

Efficiency Calibration Used Done On : 12/16/2016

Efficiency ID : ULAR\_\_PLANE\_90D\_

*REVIEWED*  
*Joe O'Gara*  
*10/2/17*

Peak analysis results available for reporting purposes

\*\*\*\*\*  
 \*\*\* N U C L I D E I D E N T I F I C A T I O N R E P O R T \*\*\*  
 \*\*\*\*\*

Sample Title: WGTV-13 09/16/2017  
 Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/m2 )	Activity Uncertainty
-----------------	------------------	-----------------	--------------	-----------------------	-------------------------

\* = Energy line found in the spectrum.  
 @ = Energy line not used for Weighted Mean Activity  
 Energy Tolerance : 1.000 keV  
 Nuclide confidence index threshold = 0.30  
 Errors quoted at 1.960 sigma

\*\*\*\*\*  
 \*\*\* I N T E R F E R E N C E C O R R E C T E D R E P O R T \*\*\*\*\*  
 \*\*\*\*\*

Nuclide	Nuclide	Wt mean	Wt mean
Name	Id	Activity	Activity
	Confidence	(pCi/m2 )	Uncertainty

? = Nuclide is part of an undetermined solution  
 X = Nuclide rejected by the interference analysis  
 @ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

peak search results available for nuclide analysis.

\*\*\*\*\*  
\*\*\* N U C L I D E M D A R E P O R T \*\*\*\*\*  
\*\*\*\*\*

Detector Name: 3844

Sample Geometry:

Sample Title: WGTV-13 09/16/2017

Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
K-40	1460.81	10.67	4.9749E+005	4.97E+005	1.7099E+006
SC-46	889.25	99.98	1.5860E+004	1.59E+004	4.4257E+003
	1120.51	99.99	1.9918E+004		-9.4551E+002
CO-57	122.06	85.51	2.0522E+004	2.05E+004	-6.8942E+003
	136.48	10.60	1.4913E+005		-7.9346E+004
CO-60	1173.22	100.00	1.6546E+004	1.52E+004	-3.4206E+003
	1332.49	100.00	1.5196E+004		1.0466E+004
SE-75	96.73	3.41	5.9966E+005	2.13E+004	-9.7234E+004
	121.11	16.70	1.0575E+005		2.2102E+004
	136.00	59.20	2.7095E+004		1.1059E+004
	198.60	1.45	9.3650E+005		5.1686E+005
	264.65	59.80	2.1312E+004		-2.1700E+004
	279.53	25.20	5.1261E+004		-1.0008E+004
	303.91	1.32	9.4936E+005		-5.9788E+005
	400.65	11.40	9.5445E+004		-5.1641E+004
KR-85	513.99	0.43	3.9220E+006	3.92E+006	1.3648E+006
KR-85M	151.18	75.30	2.0055E+004	2.01E+004	-4.4649E+003
	304.87	14.00	9.2026E+004		1.5887E+004
SR-85	513.99	99.27	1.6989E+004	1.70E+004	5.9121E+003
Y-88	898.02	93.40	1.8356E+004	1.21E+004	1.0709E+004
	1836.01	99.38	1.2095E+004		6.0984E+003
CD-109	88.03	3.72	6.6522E+005	6.65E+005	6.9117E+005
SN-113	255.12	1.93	7.0230E+005	1.97E+004	9.6721E+005
	391.69	64.90	1.9738E+004		8.3667E+003
CS-134	475.35	1.46	8.5415E+005	1.83E+004	1.1064E+005
	563.23	8.38	1.6662E+005		4.1430E+004
	569.32	15.43	8.4382E+004		3.0114E+002
	604.70	97.60	1.8352E+004		-1.3952E+004
	795.84	85.40	1.8325E+004		-3.4426E+003
	801.93	8.73	1.6757E+005		7.6218E+004
	1038.57	1.00	1.7795E+006		8.0741E+005
	1167.94	1.80	9.1647E+005		2.9015E+004
	1365.15	3.04	5.0802E+005		-9.6293E+004
CS-136	66.91	12.50	3.1939E+005	1.49E+004	-1.7040E+005
	86.29	6.30	4.0192E+005		2.3012E+005
	153.22	7.46	1.9860E+005		4.8163E+004
	163.89	4.61	3.0456E+005		-2.0423E+005
	176.55	13.56	1.0005E+005		-6.9560E+004
	273.65	12.66	1.0581E+005		4.0562E+004
	340.57	48.50	2.8058E+004		-3.3135E+003

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
CS-136	818.50	99.70	1.4883E+004	1.49E+004	3.3539E+003
	1048.07	79.60	2.0493E+004		-1.0563E+003
	1235.34	19.70	9.5541E+004		8.3581E+004
CS-137	661.65	85.12	1.6591E+004	1.66E+004	-8.2840E+003
CS-138	138.10	1.49	1.1962E+006	1.76E+004	-5.3245E+005
	227.76	1.51	1.0342E+006		-5.1075E+004
	408.98	4.66	2.9840E+005		3.1621E+004
	462.79	30.70	4.6792E+004		4.0406E+002
	546.94	10.80	1.3649E+005		-3.3891E+004
	871.80	5.11	3.0928E+005		-1.3964E+005
	1009.78	29.80	5.7182E+004		-3.4046E+004
	1147.22	1.24	1.5350E+006		4.7028E+005
	1343.59	1.14	1.3433E+006		-2.6930E+005
	1435.86	76.30	1.7638E+004		1.1244E+004
CE-139	165.85	80.35	1.7384E+004	1.74E+004	4.7304E+003
EU-152	121.78	28.40	6.1715E+004	5.19E+004	-2.3525E+004
	244.69	7.49	1.8629E+005		-7.2782E+004
	344.27	26.50	5.1910E+004		3.6736E+002
	411.11	2.21	5.7225E+005		3.1711E+005
	443.98	3.11	4.4260E+005		1.3851E+005
	778.89	12.74	1.1793E+005		5.1416E+004
	867.32	4.16	3.2839E+005		4.5427E+004
	964.01	14.40	1.4143E+005		5.7127E+004
	1085.78	10.00	1.7806E+005		9.1453E+004
	1112.02	13.30	1.2758E+005		-3.5981E+004
EU-154	1407.95	20.70	5.8221E+004	4.33E+004	-8.8907E+004
	123.07	40.40	4.3340E+004		6.9290E+003
	188.25	0.23	6.3848E+006		6.2737E+006
	247.93	6.83	1.9268E+005		-2.7045E+004
	401.30	0.19	5.6442E+006		-1.9428E+006
	444.39	0.55	2.5044E+006		4.2322E+005
	478.26	0.21	5.9262E+006		-8.1946E+004
	557.56	0.25	5.4371E+006		-1.8527E+005
	582.00	0.89	1.9424E+006		2.0347E+006
	591.76	4.91	2.7033E+005		-2.1629E+005
	625.22	0.32	4.0585E+006		-1.1872E+006
	676.59	0.14	9.7549E+006		-6.8428E+005
	692.42	1.78	7.2078E+005		-6.6623E+005
	715.76	0.17	8.3400E+006		-6.1597E+005
	722.30	20.00	7.8555E+004		7.5315E+003
	756.86	4.50	3.3880E+005		3.9260E+004
	815.55	0.50	2.9886E+006		1.9245E+006
	845.39	0.58	2.6152E+006		-1.2659E+006
	850.64	0.23	6.0791E+006		-2.1875E+006
	873.20	12.09	1.1495E+005		2.0764E+004
	892.73	0.50	3.3330E+006		-5.1177E+005
	904.05	0.85	2.0595E+006		-3.4028E+005
	996.30	10.34	1.5761E+005		8.3090E+004
	1004.76	17.90	8.3337E+004		2.6188E+004
	1128.40	0.29	6.6798E+006		-6.5457E+006

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
EU-154	1140.90	0.22	7.6058E+006	4.33E+004	-6.2515E+006
	1241.60	0.13	1.4496E+007		6.6994E+006
	1246.60	0.80	1.8502E+006		-1.7811E+005
	1274.51	34.40	4.9495E+004		-2.6714E+004
	1494.08	0.71	1.2894E+006		-4.5713E+004
	1596.45	1.80	7.8399E+005		6.0522E+004
HG-203	279.19	77.30	1.6747E+004	1.67E+004	-4.3007E+003
BI-214	609.31	46.30	4.2102E+004	4.21E+004	2.7184E+004
	768.36	5.04	3.2285E+005		1.6717E+005
	806.17	1.23	1.0012E+006		-6.5539E+005
	934.06	3.21	4.9086E+005		2.7051E+005
	1120.29	15.10	1.3187E+005		-6.2600E+003
	1155.19	1.69	1.0299E+006		-2.8145E+005
	1238.11	5.94	3.1386E+005		2.1030E+005
	1280.96	1.47	9.8789E+005		5.7509E+004
	1377.67	4.11	4.0514E+005		3.0063E+005
	1385.31	0.78	1.8438E+006		2.7738E+005
	1401.50	1.39	1.1096E+006		1.0200E+006
	1407.98	2.48	4.8596E+005		-7.4209E+005
	1509.19	2.19	6.5198E+005		8.1907E+004
	1661.28	1.15	9.6835E+005		4.8826E+005
	1729.60	3.05	3.9547E+005		2.1358E+005
	1764.49	15.80	1.0441E+005		8.3725E+004
	1847.44	2.12	6.5119E+005		-1.5340E+005
	2118.54	1.21	0.0000E+000		0.0000E+000
	74.81	6.33	5.3852E+005	3.98E+004	1.1699E+005
	77.11	10.70	2.9159E+005		1.6896E+005
	87.20	3.70	6.7405E+005		7.4589E+004
	89.80	1.03	2.2784E+006		-6.6235E+005
	241.98	7.49	2.0010E+005		3.8509E+004
	295.21	19.20	6.9123E+004		-3.6858E+004
	351.92	37.20	3.9817E+004		2.4630E+004
	785.91	1.10	1.3865E+006		-1.5876E+005

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or has not been calculated

@ = Half-life too short to be able to perform the decay correction

Filename: 3844

Report Generated On : 9/16/2017 12:51:28 PM

Sample Title : WGTV-12 09/16/2017 ✓  
 Sample Description :  
 Sample Identification :  
 Sample Type :  
 Sample Geometry : 3 m - 90d ✓

Peak Locate Threshold : 3.00  
 Peak Locate Range (in channels) : 1 - 65535  
 Peak Area Range (in channels) : 200 - 8000  
 Identification Energy Tolerance : 1.000 keV

Sample Size : 2.830E+001 m2 ✓

Sample Taken On : 9/16/2017 12:40:00 PM  
 Acquisition Started : 9/16/2017 12:41:27 PM

Live Time : 600.0 seconds ✓  
 Dead Time : 600.2 seconds ✓

Dead Time : 0.03 % ✓

Energy Calibration Used Done On : 10/12/2016  
 Efficiency Calibration Used Done On : 12/16/2016  
 Efficiency ID : ULAR\_\_PLANE\_90D\_

REVIEWED  
 Joe D. Gule  
 10/24/17



peak analysis results available for reporting purposes

\*\*\*\*\*  
 \*\*\* N U C L I D E I D E N T I F I C A T I O N R E P O R T \*\*\*  
 \*\*\*\*\*

Sample Title: WGTV-12 09/16/2017  
 Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide	Id	Energy	Yield	Activity	Activity
Name	Confidence	(keV)	(%)	(pCi/m2 )	Uncertainty

\* = Energy line found in the spectrum.  
 @ = Energy line not used for Weighted Mean Activity  
 Energy Tolerance : 1.000 keV  
 Nuclide confidence index threshold = 0.30  
 Errors quoted at 1.960 sigma

\*\*\*\*\*  
\*\*\* I N T E R F E R E N C E C O R R E C T E D R E P O R T \*\*\*\*\*  
\*\*\*\*\*

Nuclide	Nuclide Id	Wt mean Activity	Wt mean Activity
Name	Confidence	(pCi/m2 )	Uncertainty

? = Nuclide is part of an undetermined solution

X = Nuclide rejected by the interference analysis

@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

> peak search results available for nuclide analysis.

\*\*\*\*\*  
\*\*\* N U C L I D E M D A R E P O R T \*\*\*\*\*  
\*\*\*\*\*

Detector Name: 3844  
Sample Geometry:  
Sample Title: WGTV-12 09/16/2017  
Nuclide Library Used: C:\GENIE2K\CAMFILES\STDLIB.NLB

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
K-40	1460.81	10.67	4.5041E+005	4.50E+005	1.4169E+006
SC-46	889.25	99.98	1.2987E+004	1.30E+004	3.6789E+003
	1120.51	99.99	1.7056E+004		1.4936E+004
CO-57	122.06	85.51	1.9149E+004	1.91E+004	-1.5292E+004
	136.48	10.60	1.4321E+005		-8.7738E+004
CO-60	1173.22	100.00	1.8752E+004	1.55E+004	-2.5759E+003
	1332.49	100.00	1.5476E+004		-6.9246E+003
SE-75	96.73	3.41	5.6202E+005	2.08E+004	-2.8499E+005
	121.11	16.70	9.7628E+004		-8.0402E+004
	136.00	59.20	2.5577E+004		-3.1414E+003
	198.60	1.45	8.9176E+005		-5.8652E+004
	264.65	59.80	2.0848E+004		1.4925E+004
	279.53	25.20	4.7244E+004		1.5519E+003
	303.91	1.32	8.8837E+005		3.5873E+005
	400.65	11.40	1.0270E+005		-3.3474E+004
KR-85	513.99	0.43	3.8455E+006	3.85E+006	1.0618E+005
KR-85M	151.18	75.30	1.9315E+004	1.93E+004	1.5526E+004
	304.87	14.00	8.3417E+004		3.8956E+003
SR-85	513.99	99.27	1.6658E+004	1.67E+004	4.5997E+002
Y-88	898.02	93.40	1.6074E+004	8.21E+003	-1.0418E+004
	1836.01	99.38	8.2060E+003		-2.9857E+003
CD-109	88.03	3.72	6.3337E+005	6.33E+005	2.3637E+005
SN-113	255.12	1.93	6.1137E+005	1.75E+004	-2.7792E+004
	391.69	64.90	1.7545E+004		1.6835E+003
CS-134	475.35	1.46	7.7339E+005	1.66E+004	-4.9806E+005
	563.23	8.38	1.3396E+005		-5.9485E+004
	569.32	15.43	7.3301E+004		-1.7253E+004
	604.70	97.60	1.6605E+004		4.3239E+002
	795.84	85.40	1.7695E+004		-3.2685E+003
	801.93	8.73	1.7713E+005		4.3423E+004
	1038.57	1.00	1.3785E+006		1.7026E+005
	1167.94	1.80	9.3998E+005		-1.2533E+006
	1365.15	3.04	4.3610E+005		5.4787E+004
CS-136	66.91	12.50	3.1369E+005	1.37E+004	-1.4280E+005
	86.29	6.30	3.8358E+005		6.9178E+004
	153.22	7.46	1.8556E+005		1.8538E+005
	163.89	4.61	2.8198E+005		-4.2784E+005
	176.55	13.56	9.7883E+004		1.3014E+003
	273.65	12.66	8.8583E+004		-3.7763E+002
	340.57	48.50	2.4312E+004		1.9641E+004

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
CS-136	818.50	99.70	1.3661E+004	1.37E+004	-8.0233E+003
	1048.07	79.60	1.8512E+004		7.9722E+001
	1235.34	19.70	9.9533E+004		7.3852E+004
CS-137	661.65	85.12	1.7495E+004	1.75E+004	1.2465E+003
CS-138	138.10	1.49	1.1902E+006	2.17E+004	5.1298E+005
	227.76	1.51	9.8724E+005		2.2035E+005
	408.98	4.66	2.9410E+005		1.2662E+004
	462.79	30.70	4.6568E+004		2.6609E+004
	546.94	10.80	1.3446E+005		2.3598E+004
	871.80	5.11	2.9980E+005		6.0880E+004
	1009.78	29.80	6.3291E+004		-2.1857E+004
	1147.22	1.24	1.2951E+006		-8.6774E+005
	1343.59	1.14	1.1348E+006		-1.3565E+005
	1435.86	76.30	2.1698E+004		-1.4283E+004
CE-139	165.85	80.35	1.6411E+004	1.64E+004	2.0968E+003
EU-152	121.78	28.40	5.7280E+004	4.38E+004	-6.5903E+004
	244.69	7.49	1.7321E+005		-4.0421E+004
	344.27	26.50	4.3840E+004		-5.8802E+004
	411.11	2.21	5.5176E+005		1.2865E+005
	443.98	3.11	4.0996E+005		2.0983E+005
	778.89	12.74	1.0688E+005		-6.0018E+003
	867.32	4.16	3.6742E+005		2.9927E+005
	964.01	14.40	1.1750E+005		-2.4557E+004
	1085.78	10.00	1.5084E+005		7.2147E+004
	1112.02	13.30	1.3046E+005		1.4236E+005
	1407.95	20.70	5.8221E+004		-4.6321E+004
EU-154	123.07	40.40	4.1580E+004	4.16E+004	1.0052E+004
	188.25	0.23	5.7875E+006		-6.3077E+005
	247.93	6.83	1.8294E+005		1.6458E+004
	401.30	0.19	6.0384E+006		-4.2117E+006
	444.39	0.55	2.3325E+006		-2.3541E+005
	478.26	0.21	5.5680E+006		-2.9216E+006
	557.56	0.25	5.1084E+006		3.5622E+006
	582.00	0.89	1.6489E+006		1.0694E+006
	591.76	4.91	2.7242E+005		-2.6973E+005
	625.22	0.32	4.3033E+006		-1.1905E+005
	676.59	0.14	9.2830E+006		7.2433E+005
	692.42	1.78	6.7395E+005		3.2688E+005
	715.76	0.17	8.1901E+006		-1.5377E+006
	722.30	20.00	7.1333E+004		5.4104E+004
	756.86	4.50	2.8678E+005		-1.3815E+005
	815.55	0.50	2.8411E+006		1.3307E+006
	845.39	0.58	2.2848E+006		1.3334E+005
	850.64	0.23	6.0791E+006		1.4354E+005
	873.20	12.09	1.0911E+005		2.5752E+004
	892.73	0.50	2.9874E+006		-6.2554E+005
	904.05	0.85	1.8315E+006		-3.0032E+006
	996.30	10.34	1.3966E+005		3.7563E+004
	1004.76	17.90	8.9584E+004		-6.9587E+003
	1128.40	0.29	5.3751E+006		-1.5066E+006

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/m2 )	Nuclide MDA (pCi/m2 )	Activity (pCi/m2 )
EU-154	1140.90	0.22	7.3184E+006	4.16E+004	2.4745E+006
	1241.60	0.13	1.4496E+007		-6.7670E+006
	1246.60	0.80	2.3665E+006		7.8701E+003
	1274.51	34.40	4.2073E+004		-1.8187E+004
	1494.08	0.71	1.3728E+006		-1.9265E+005
	1596.45	1.80	8.0635E+005		-2.7069E+005
HG-203	279.19	77.30	1.5341E+004	1.53E+004	1.6675E+003
BI-214	609.31	46.30	3.6467E+004	3.65E+004	5.0555E+004
	768.36	5.04	2.8733E+005		3.5183E+005
	806.17	1.23	1.1936E+006		-7.5594E+005
	934.06	3.21	4.6986E+005		3.9846E+005
	1120.29	15.10	1.1293E+005		9.8886E+004
	1155.19	1.69	9.9384E+005		3.0449E+005
	1238.11	5.94	3.2397E+005		-1.6498E+005
	1280.96	1.47	9.6852E+005		-5.3573E+005
	1377.67	4.11	3.4081E+005		1.8455E+005
	1385.31	0.78	1.4760E+006		-7.4491E+005
	1401.50	1.39	7.0364E+005		-3.7973E+005
	1407.98	2.48	4.8596E+005		-3.8664E+005
	1509.19	2.19	5.1883E+005		5.8080E+004
	1661.28	1.15	8.0014E+005		3.0516E+005
	1729.60	3.05	3.9547E+005		2.1358E+005
	1764.49	15.80	8.4365E+004		5.1166E+004
	1847.44	2.12	5.3913E+005		2.5132E+005
	2118.54	1.21	0.0000E+000		0.0000E+000
	74.81	6.33	5.2953E+005	3.76E+004	5.4070E+005
	77.11	10.70	2.8325E+005		2.2806E+005
	87.20	3.70	6.4535E+005		1.5745E+005
	89.80	1.03	2.1873E+006		1.1235E+006
	241.98	7.49	1.8630E+005		-2.1364E+004
	295.21	19.20	6.6557E+004		3.2358E+004
	351.92	37.20	3.7570E+004		4.1228E+004
	785.91	1.10	1.3116E+006		3.0444E+005

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or has not been calculated

@ = Half-life too short to be able to perform the decay correction

\*\*\*\*\*  
\*\*\*\*\* G A M M A S P E C T R U M A N A L Y S I S \*\*\*\*\*  
\*\*\*\*\*

Filename: C:\Pete's Current Stuff\LaCrosse\ISOCS stuff\WGTV spectrums\W

Report Generated On : 1/8/2018 7:44:48 AM  
Sample Title : WGTV Sump 1m 180 collimator  
Sample Description :  
Sample Identification : WGTV\_180  
Sample Type :  
Sample Geometry :

Peak Locate Threshold : 3.00  
Peak Locate Range (in channels) : 1 - 65535  
Peak Area Range (in channels) : 1 - 8192  
Identification Energy Tolerance : 1.500 keV

Sample Size : 1.000E+000 sq meter

Sample Taken On : 9/1/2017 9:14:00 AM  
Acquisition Started : 9/1/2017 9:14:48 AM

Live Time : 600.0 seconds  
Real Time : 603.8 seconds

Dead Time : 0.63 %

Energy Calibration Used Done On : 10/12/2016  
Efficiency Calibration Used Done On : 9/29/2017  
Efficiency ID : WGTV sump

\*\*\*\*\*  
\*\*\*\*\* P E A K A N A L Y S I S R E P O R T \*\*\*\*\*  
\*\*\*\*\*

Detector Name: 3844

Sample Title: WGTV Sump 1m 180 collimator

Peak Analysis Performed on: 1/8/2018 7:44:48 AM

Peak Analysis From Channel: 1

Peak Analysis To Channel: 8192

Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	69-	82	77.59	19.24	1.11	6.65E+002	53.64	8.04E+002
2	2635-	2661	2648.40	662.26	4.03	2.22E+004	211.59	5.14E+003
3	3235-	3246	3240.78	810.34	0.34	1.50E+001	9.61	3.00E+001
4	5320-	5351	5335.60	1333.76	2.54	4.56E+002	26.39	4.80E+001
5	5834-	5865	5850.14	1462.26	3.23	4.31E+002	27.40	6.39E+001

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000 sigma



\*\*\*\*\*  
\*\*\*\*\* N U C L I D E I D E N T I F I C A T I O N R E P O R T \*\*\*\*\*  
\*\*\*\*\*

Sample Title: WGTV Sump 1m 180 collimator

Nuclide Library Used: C:\GENIE2K\CAMFILES\ESClearance.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/sq m)	Activity Uncertainty
K-40	0.860	1460.81*	10.67	3.48172E+006	2.63943E+005
CS-137	0.974	661.65*	85.12	1.31495E+007	7.99653E+005

\* = Energy line found in the spectrum.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.500 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 1.000 sigma

\*\*\*\*\*  
 \*\*\*\*\* I N T E R F E R E N C E C O R R E C T E D R E P O R T \*\*\*\*\*  
 \*\*\*\*\*

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/sq m)	Wt mean Activity Uncertainty
K-40	0.860	3.481717E+006	2.639429E+005
CS-137	0.974	1.314950E+007	7.996531E+005

? = nuclide is part of an undetermined solution

X = nuclide rejected by the interference analysis

@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.000 sigma

\*\*\*\*\* U N I D E N T I F I E D P E A K S \*\*\*\*\*

Peak Locate Performed on: 1/8/2018 7:44:48 AM  
 Peak Locate From Channel: 1  
 Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
1	19.24	1.1077E+000	8.07		
3	810.34	2.5028E-002	64.00		
4	1333.76	7.6000E-001	5.79	Tol.	CO-60

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.000 sigma

\*\*\*\*\*  
 \*\*\*\*\* N U C L I D E M D A R E P O R T \*\*\*\*\*  
 \*\*\*\*\*

Detector Name: 3844  
 Sample Geometry:  
 Sample Title: WGTV Sump 1m 180 collimator  
 Nuclide Library Used: C:\GENIE2K\CAMFILES\ESClearance.NLB

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/sq m)	Nuclide MDA (pCi/sq m)	Activity (pCi/sq m)
	CO-60	1173.22	100.00	8.2299E+004	8.23E+004	3.5545E+005
		1332.49	100.00	8.8515E+004		3.8541E+005
	Nb-94	702.60	97.90	3.1465E+004	3.15E+004	5.2336E+003
		871.10	99.90	3.5357E+004		-2.0934E+004
	Ag-108m	433.90	90.50	1.0259E+005	3.68E+004	2.9125E+003
		614.30	89.80	6.6359E+004		4.0286E+004
		722.90	90.80	3.6778E+004		-3.3860E+003
	Sb-125	427.90	29.80	3.0432E+005	3.04E+005	-2.3675E+005
		600.60	17.77	3.3033E+005		1.4309E+005
	Ba-133	81.00	34.10	4.4080E+005	1.27E+005	-1.4660E+006
		356.00	62.05	1.2710E+005		1.1906E+004
	CS-134	604.70	97.60	6.1241E+004	4.01E+004	1.4407E+004
		795.84	85.40	4.0091E+004		2.1056E+004
+	CS-137	661.65*	85.12	2.9439E+005	2.94E+005	1.3150E+007
	EU-152	121.78	28.40	3.3077E+005	1.38E+005	1.0199E+005
		344.27	26.50	2.9186E+005		9.3608E+004
		778.89	12.74	2.4678E+005		-2.3850E+005
		964.01	14.40	3.1061E+005		8.7714E+004
		1085.78	10.00	3.9917E+005		2.6718E+005
		1112.02	13.30	2.8275E+005		-1.4123E+005
		1407.95	20.70	1.3850E+005		7.5440E+004
	EU-154	123.10	40.60	2.2954E+005	9.96E+004	-2.1179E+004
		1274.40	35.00	9.9574E+004		-7.7725E+003
	EU-155	105.31	21.20	5.0334E+005	5.03E+005	4.8033E+005
	AM-241	59.50	35.90	8.0164E+005	8.02E+005	-1.8947E+005

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

> = Calculated MDA is zero due to zero counts in the region, or  
 the region is outside the spectrum, or has not been calculated

@ = Half-life too short to be able to perform the decay correction